



# Jacob L. Steenwyk

Ph.D. Candidate  
Evolutionary genomics  
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<https://jlsteenwyk.github.io>

## EDUCATION

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

## AWARDS

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

## RESEARCH INTERESTS

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

## SOCIETIES

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*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

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<b>National Institutes of Health</b>	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
<b>Ford Foundation Predoctoral Fellow</b>	Principal investigator, 08/19-08/22, The consequences of aberrant cell cycle and DNA repair processes in budding yeast, \$72,000 (declined)
<b>Curb Center ArtLab Fellow</b>	Principal investigator, 12/18-04/19, Bridging the gap between artist and scientist, \$300

## INVITED TALKS

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

## CONTRIBUTED TALKS

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

## UNDERGRADUATE ADVISING

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<b>Current</b>	Olivia Zheng
<b>Current</b>	Megan A. Phillips
<b>2019</b>	Benjamin Buckman
<b>2018</b>	Devin G. Arrants

## WORKSHOP TEACHING

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- 2019** Founder and instructor of ‘A beginner’s guide to making figures in R’, Vanderbilt University, Nashville, TN (scheduled)
- 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

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- 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

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- 2019** 30<sup>th</sup> Fungal Genetics Conference at Asilomar, Pacific Grove, CA
- 2019** Asperfest pre-meeting at 30<sup>th</sup> 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

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- 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

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- 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, 30<sup>th</sup> 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

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- 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

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

## PUBLICATIONS

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\* 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.**, 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<sup>^</sup>, & A. Rokas<sup>^</sup> (2019). Extensive loss of cell cycle and DNA repair genes in an ancient lineage of bipolar budding yeasts. bioRxiv: doi: 10.1101/546366
- 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. Larochelle, & 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

- (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