Jacob L. Steenwyk

Ph.D. Candidate
Evolutionary genomics
jacob.steenwyk@vanderbilt.edu
https://jlsteenwyk.github.io

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	Gilliam Predoctoral Fellowship, Howard Hughes Medical Institute
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	*GENETICS* 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

Howard Hughes Medical Institute	Principal co-investigator (shared with Antonis Rokas), 09/19-09/22, Examining the loss of diverse DNA repair genes and long-term hypermutation in a lineage of budding yeasts, Gilliam Fellowship, Individual Predoctoral Fellowship, $150,000
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 (declined)
Ford Foundation Predoctoral Fellow	Principal investigator, 08/19-08/22, The consequences of aberrant cell cycle and DNA repair processes in budding yeast, Individual Predoctoral Fellowship, $72,000 (declined)
Curb Center ArtLab Fellow	Principal investigator, 12/18-04/19, Bridging the gap between artist and scientist, ArtLab, Vanderbilt University, $300

INVITED TALKS

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

CONTRIBUTED TALKS

2019	*Extensive loss of cell cycle and DNA repair genes in an ancient lineage of bipolar budding yeast*. DNA Damage and Response Journal Club, Vanderbilt University, Nashville, TN
2019	*Extensive loss of cell cycle and DNA repair genes in an ancient lineage of bipolar budding yeast*. Research in Progress Seminar, Vanderbilt University, Nashville, TN
2019	*The yeast with the least*, Hanseniaspora. Biological Sciences Annual Retreat, Vanderbilt University, Nashville, TN
2019	*Microbes and our food*. Science club at the library, Nashville Public Library, Nashville, TN
2018	*From bread to beer: Out unwitting domestication of yeast*. Nashville Science Club, Jackalope Brewing Company, Nashville, TN
2017	*Extensive copy number variation in fermentation-related genes among* Saccharomyces cerevisiae *wine strains*. Mycological Society of America, University of Georgia, Athens, GA
2016	*Population structure and copy number variation in the fungal pathogen* Cryptococcus gattii. Mycological Society of America, University of California Berkeley, Berkeley, CA

2016 *Population structure and copy number variation in the fungal pathogen* Cryptococcus gattii. Graduate Student Multidisciplinary Conference, Clark University, Worcester, MA

UNDERGRADUATE ADVISING

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

WORKSHOP TEACHING

2019 Organizer and instructor, Values-based leadership, Vanderbilt University, Nashville, TN
2019 Founder and instructor, '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 Gilliam Fellows Annual Meeting, Howard Hughes Medical Institute, Bethesda, MD
2019 Molecular Mechanisms in Evolution, Gordon Research Conference, Easton, MA
2019 Molecular Mechanisms in Evolution, Gordon Research Seminar, Easton, MA
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. Inclusion Coordinator, The Evolutionary Studies Initiative at Vanderbilt, Vanderbilt University, Nashville, TN

2019-Pres. Graphic Illustrator, The Evolutionary Studies Initiative at Vanderbilt, Vanderbilt University, Nashville, TN

2019-Pres. President, Inclusivity in Biosciences Association, Vanderbilt University, Nashville, TN

2018-Pres. Volunteer Deputy, American Society of Microbiology Vanderbilt University Chapter

2017-Pres. Educational outreach booth design and execution, MEGA*Microbe*, 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

2019-2020 Co-chair, MEGA*Microbe*, Vanderbilt Institute for Infections, Immunology and Inflammation, Nashville, TN

2018-2019 Vice President, Inclusivity in Biosciences Association, Vanderbilt University, Nashville, TN

2013-2019 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 President, Graduate Student Association, Department of Biological Sciences, Vanderbilt University, Nashville, TN

2018-2019 Vice co-chair, MEGA*Microbe*, 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; Genome Biology and Evolution; BMC Genomics; Genetics; 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.

PUBLICATIONS

Preprints/Submitted

(2) **Steenwyk, J.L.***, A.L. Lind*, L.N.A. Ries, T.T. dos Reis, L.P. Silva, F.B. Almeida, R.W. Bastos, F. Rodrigues, K. Lagrou, G.H. Goldman^, & A. Rokas^ (2019). Pathogenic allodiploid hybrids of *Aspergillus* fungi. *In revision*.

(1) **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

Published

(15) 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. mBio. doi: 10.1128/mBio.02445-19.

(14) Mead, M.E.*, H.A. Raja*, **J.L. Steenwyk**, S.L. Knowles, N.H. Oberlies^, & A. Rokas^ (2019). Draft genome sequence of the griseofulvin-producing fungus *Xylaria flabelliformis* strain G536. (*Equal contributors; ^Senior authors). Microbiology Resource Announcements. doi: 10.1128/MRA.00890-19.

(13) **Steenwyk, J.L.** & A. Rokas (2019). treehouse: a user-friendly application to obtain subtrees from large phylogenies. BMC Research Notes. doi: 10.1186/s13104-019-4577-5

(12) 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. PLoS Genetics. doi: 10.1371/journal.pgen.1008304

(11) **Steenwyk, J.L.**, X.-X. Shen, A.L. Lind, G.H. Goldman, & A. Rokas (2019). A robust phylogenomic timetree for biotechnologically and medically important fungi in the genera *Aspergillus* and *Penicillium*. mBio. doi: 10.1128/mBio.00925-19

(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). (*Equal contributors; ^Senior authors). 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