

Curriculum Vitae

Jennifer H. Wisecaver

Assistant Professor of Biochemistry

ADDRESS

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EDUCATION

2012 Ph.D. Ecology & Evolutionary Biology University of Arizona, Tucson, Arizona,
USA
2007 B.S. Biology Humboldt State University, Arcata, California,
USA

ACADEMIC APPOINTMENTS

2017 – present Assistant Professor, Department of Biochemistry, Purdue University
2013 – 2017 Post-doctoral Fellow, Vanderbilt University, Advisor: A. Rokas
2007 – 2012 Graduate Student, University of Arizona, Advisor: J. D. Hackett
2005 – 2006 Summer Intern, Research Experience for Undergraduates, American Museum of
Natural History, New York, Advisors: M. E. Siddall and S. L. Perkins

CURRENT AWARDS

National Science Foundation PI, 08/2018-07/2023, DEB-1831493: Dimensions of Biodiversity, Eco-
Evolutionary Drivers of Diversity in Toxic Algal Blooms, \$1,999,208
DARPA Co-PI, anticipated award period: 10/2018-09/2022, Advanced Plant Technologies:
Living Surveillance to Enhance National Security (LiSTENS), Subaward: \$717,959

PAST AWARDS

National Science Foundation PI, 09/2014-08/2017, IOS-1401682: National Plant Genome Initiative Postdoctoral
Research Fellowship, The Evolution of Secondary Metabolic Gene Clusters in
Plants, \$216,000
National Science Foundation Co-PI, 07/2010-06/2011, DEB-1010661: Doctoral Dissertation Improvement
Grant, Dissertation Research: Determining the Role of Horizontal Gene Transfer
on Plastid Acquisition and Endosymbiosis, \$14,969

PROFESSIONAL AFFILIATIONS

American Society of Plant Biologists, Genetics Society of America, American Society of Microbiology, Mycological Society of America, Phycological Society of America, Society for the Study of Evolution, Phytochemical Society of North America

HONORS

- 2018 Arthur C. Neish Young Investigator Award, Phytochemical Society of North America
- 2017 Postdoc of the Year, Vanderbilt University
- 2016 DeLill Nasser Travel Award, Genetics Society of America
- 2012 Harold C. Bold Award, Phycological Society of America
- 2012 Judges' Choice for excellent video and poster presentation, NSF IGERT PI meeting
- 2011 Robert W. Hoshaw Scholarship, Ecology and Evolutionary Biology, University of Arizona
- 2011 Outstanding Scholarship Award, College of Science, University of Arizona
- 2010 Galileo Circle Scholarship, University of Arizona College of Science
- 2010 Graduate and Professional Student Council travel grant, University of Arizona
- 2009 Honorable Mention, National Science Foundation Graduate Research Fellowship
- 2005 Malcolm Oliphant Marine Science Scholarship, Humboldt State University

PUBLICATIONS (34 published)

H-index 17 per Google Scholar (as of 23 August 2019), for current, see

<https://scholar.google.com/citations?user=2lrO8j8AAAAJ&hl=en>

1. Verster, K, **JH Wisecaver**, RP Duncan, M Karageorgi, AD Gloss, E Armstrong, DK Price, AR menon, ZA Ali, & NK Whiteman. Horizontal transfer of prokaryotic cytolethal distending toxin B genes to eukaryotes. *Molecular Biology and Evolution*. msz146.
2. Gao, S, SE Golde, **JH Wisecaver**, Y Zhang, L Guo, L-J Ma, A Rokas, & AE Glenn. Genome-wide analysis of *Fusarium verticillioides* reveals potential contribution of horizontal gene transfer to the expansion of metabolism. *Fungal Genetics and Biology*. 128:60-73.
3. Colle, M, CP Leisner, CM Wai, S Ou, KA Bird, J Wang, **JH Wisecaver**, AE Yocca, P Callow, G Ben-Zvi, A Brodt, K Baruch, T Swale, L Shiue, G Song, KL Childs, A Schillmiller, N Vorsa, CR Buell, R VanBuren, N Jiang, & PP Edger. 2019. Haplotype-phased genome and evolution of phytonutrient pathways of tetraploid highbush blueberry. *Nature Plants* 8: giz012.
4. Smith, SD, R Angelovici, K Heyduk, HA Maeda, GD Moghe, JC Pires, JR Widhalm, and **JH Wisecaver**. 2019. The Renaissance of comparative biochemistry. *Am J Bot*. 106: 1-11.
5. Shen, X-X and 26 other authors include **JH Wisecaver**. 2018. The tempo and mode of genome evolution in the budding yeast subphylum. *Cell*. 175: 1533-1545. e20.
6. Rokas, A, **JH Wisecaver**, & AL Lind. 2018. The birth, evolution, and death of metabolic gene clusters in fungi. *Nature Reviews Microbiology*. 16: 10.1038/s41579-018-0075-3.
7. Eidem, HR, JL Steenwyk, JH Wisecaver, JA Capra, P Abbot, and 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 Med Genomics*. 11: 107.

8. Lim, FY, TH Won, JA Baccile, **JH Wisecaver**, A Rokas, FC Schroeder, & NP Keller. 2018. Fungal isocyanide synthases: an unexplored resource in eukaryotic secondary metabolism. *mBio* 9: e00785-18.
9. Gonçalves, C, **JH Wisecaver**, M Salema-Oom, M José Leandro, X-X Shen, D Peris, CT Hittinger, A Rokas, P Gonçalves. 2018. Evidence for loss and adaptive reacquisition of alcoholic fermentation in an early-derived fructophilic yeast lineage. *eLife* 7:e33034.
10. Zhang, N, G Cai, DC Price, JA Crouch, P Gladieux, B Hillman, CH Khang, M-H LeBrun, Y-H Lee, J Luo, H Qiu, D Veltri, **JH Wisecaver**, J Zhu & D Bhattacharya. 2018. Genome wide analysis of the transition to pathogenic lifestyles in Magnaporthales fungi. *Scientific Reports* 8: 5862.
11. Lind, AL, **JH Wisecaver**, C Lameiras, P Wiemann, JM Palmer, NP Keller, F Rodrigues, GH Goldman, & A Rokas. 2017. Drivers of genetic diversity in secondary metabolic gene clusters in a fungal population. *PLoS Biol* 15: e2003583.
12. **Wisecaver, JH**, AT Borowsky, V Tzin, G Jander, D Kliebenstein & A Rokas. 2017. A global co-expression approach for connecting genes to specialized metabolic pathways in plants. *The Plant Cell* 29: 944–959.
13. Lojek, LJ, AJ Farrand, **JH Wisecaver**, CE Blaby-Haas, SS Merchant, A Rokas & EP Skaar. 2017. *Chlamydomonas reinhardtii* cMO is an IsdG family heme oxygenase. *mSphere* 2: e00176-17.
14. Ohkura M, RR Fitak, **JH Wisecaver**, D DeBlasio, F Niazi, M Egholm, SD Rounsley, CD Kodira & MJ Orbach. 2017. Genome sequence of *Ophidiomyces ophiodiicola*, an emerging fungal pathogen of snakes. *Genome Announcements* 5: e00677-17.
15. **Wisecaver, JH**, WG Alexander, SB King, CT Hittinger & A Rokas. 2016. Dynamic evolution of nitric oxide detoxifying flavohemoglobins, a family of single-protein metabolic modules in bacteria and eukaryotes. *Mol Biol Evol* 33: 1979-1987.
16. Alexander, WG, **JH Wisecaver**, A Rokas & CT Hittinger. 2016. Horizontally acquired genes in early-diverging pathogenic fungi enable the use of host nucleosides and nucleotides. *PNAS* 113: 4116–4121.
17. Riley, R and 37 other authors including **JH Wisecaver**. 2016. Comparative genomics of biotechnologically important yeasts. *PNAS* 113: 9882–9887.
18. DeBlasio, DF & **JH Wisecaver**. 2016. SICLE: A high-throughput tool for extracting evolutionary relationships from phylogenetic trees. *PeerJ* 4: e2359.
19. **Wisecaver, JH** & A Rokas. 2015. Fungal metabolic gene clusters – caravans traveling across genomes and environments. *Frontiers in Microbiology* 6: 161.
20. Lasek-Nesselquist, E, **JH Wisecaver**, JD Hackett & MD Johnson. 2015. Insights into transcriptional changes that accompany organelle sequestration from the stolen nucleus of *Mesodinium rubrum*. *BMC Genomics* 16: 805.

21. U'Ren, JM*, **JH Wisecaver***, AL Paek, BL Dunn & BL Hurwitz. 2015. Draft genome sequence of the ale-fermenting *Saccharomyces cerevisiae* strain GSY2239. *Genome Announcements* 3:e00776-15. (*Equal contributors)
22. Lind, AL, **JH Wisecaver**, TD Smith, X Feng, AM Calvo & A Rokas. 2015. Examining the evolution of the regulatory circuit controlling secondary metabolism and development in the fungal genus *Aspergillus*. *PLOS Genetics* 11: e1005096.
23. Elmore, MH, KL McGary, **JH Wisecaver**, JC Slot, DM Geiser, S Sink, KO'Donnell & A Rokas. 2015. Clustering of two genes putatively involved in cyanate detoxification evolved recently and independently in multiple fungal lineages. *Genome Biol Evol* 7: 789–800.
24. **Wisecaver, JH**, JC Slot & A Rokas. 2014. The evolution of fungal metabolic pathways. *PLOS Genetics* 10: e1004816.
25. Gusev, O. and 27 other authors including **JH Wisecaver**. 2014. Comparative genome sequencing reveals genomic signature of extreme desiccation tolerance in the anhydrobiotic midge. *Nature Communications* 5: 4784.
26. **Wisecaver, JH** & JD Hackett. 2014. The impact of automated sequence selection on genome-scale phylogenetic analysis. *Mol Phylogenet Evol* 71: 184–192.
27. **Wisecaver, JH**, ML Brosnahan & JD Hackett. 2013. Horizontal gene transfer is a significant driver of gene innovation in dinoflagellates. *Genome Biol Evol* 12: 2368–2381.
28. Hackett, JD, **JH Wisecaver**, ML Brosnahan, DM Kulis, DM Anderson, D Bhattacharya, FG Plumley & DL Erdner. 2013. Independent evolution of saxitoxin synthesis in cyanobacteria and dinoflagellates. *Mol Biol Evol* 30: 70–78.
29. Molnar, I, D Lopez, **JH Wisecaver**, M Pellegrini & JD Hackett. 2012. Bio-crude transcriptomics: Gene discovery and metabolic network reconstruction for the biosynthesis of the terpenome of the hydrocarbon oil-producing green alga, *Botryococcus braunii* race B (Showa). *BMC Genomics* 13: 576.
30. Chan, CX, M Soares, M Bonaldo, **JH Wisecaver**, JD Hackett, DM Anderson, D Erdner & D Bhattacharya. 2012. Analysis of *Alexandrium tamarense* (Dinophyceae) genes reveals the complex evolutionary history of a microbial eukaryote. *J Phycology* 48: 1130–1142.
31. **Wisecaver, JH** & JD Hackett. 2011. Dinoflagellate genome evolution. *Annu Rev Microbiol* 65: 369–387.
32. **Wisecaver, J H** & J D Hackett. 2010. Transcriptome analysis reveals nuclear-encoded proteins for the maintenance of temporary plastids in the dinoflagellate *Dinophysis acuminata*. *BMC Genomics* 11: 366.
33. Sullivan, MB, B Krastins, **JL Hughes**, L Kelly, M Chase, D Sarracino & SW Chisholm. 2009. The genome and structural proteome of an ocean siphovirus: a new window into the cyanobacterial 'mobilome'. *Environ Microbiol* 11: 2935–2951.

34. **Hughes, JL** & ME Siddall. 2007. A new species of leech from the New York Metropolitan Area. *American Museum Novitates* 3578: 1–6.

PRESENTATIONS

Invited Conference Talks

1. Genome Evolution Conference. Sitges, Spain. Sept 29 – Oct 1, 2019.
2. “*Co-expression not co-location links genes to specialized metabolic pathways in plants*” 57th Annual Meeting of the Phytochemical Society of North America, San Luis Potosí, Mexico, August 4-8, 2018.
3. “*Linking genes to lineage-specific metabolic pathways: Gene network analysis of glucosinolate biosynthesis in the Brassicaceae*,” Evolution of Plant Chemical Diversity Symposium, Botany annual meeting. Rochester, Minnesota. July 21-25, 2018.
4. “*Linking genes to lineage-specific metabolic pathways: Gene network analysis of glucosinolate biosynthesis in the Brassicaceae*,” Interdisciplinary Plant Group’s 35th annual symposium, University of Missouri, Columbia. May 30-June 1, 2018.

Other Conference Talks

1. “*A global co-expression approach for connecting genes to specialized metabolic pathways in plants*,” Plant Genome Evolution Conference. Sitges, Spain. October 1-3, 2017.
Also presented at 29th Fungal Genetics Conference. Pacific Grove, CA. March 14-19, 2017.
Also presented at Evolution. Austin, TX. June 17-21, 2016.
2. “*The evolution of fungal metabolic pathways*,” Mycological Society of America Annual Meeting. East Lansing, Michigan. 2014.
3. “*Horizontal gene transfer facilitates chloroplast acquisition and endosymbiosis in dinoflagellates*,” International Symbiosis Society Congress. Krakow, Poland. 2012.
4. “*Horizontal gene transfer is a significant driver of gene innovation in dinoflagellates*,” Phycological Society of America Annual Meeting. Charleston, South Carolina. 2012.
5. “*Characterization of the Alexandrium transcriptome reveals unique nutrient utilization strategies in the dinoflagellate*,” Phycological Society of America Annual Meeting. Seattle, Washington. 2011.
6. “*The plastid thief Dinophysis acuminata has nuclear-encoded genes for plastid maintenance and metabolite exchange*,” Ocean Sciences Meeting. Portland, Oregon. 2010.

External Research Seminars

1. Biological Sciences seminar series, Bowling Green State University, November 6, 2019.
2. Ecosystem Genomics seminar series, University of Arizona, October 10, 2019.
3. “*The evolution of metabolic diversity in eukaryotes*,” Interdisciplinary Plant Group, University of Missouri, January 23, 2017

Internal Research Seminars

1. Center for Plant Biology Symposium, Sept 6, 2019
2. Hitchhikers Guide to Biomolecular Galaxy, May 9, 2019
3. Women in Data Science, March 4, 2019
4. Department of Biochemistry, October 23, 2018.
5. “*Eco-evolutionary dynamics of toxic algal blooms*” EcoLunch Seminar. Department of Biological Sciences, August 29, 2018
6. “*Linking genes to lineage-specific metabolic pathways using global co-expression networks*,” Biochemical horizons symposium, Department of Biochemistry, November 17, 2017
7. “*Linking genes to specialized metabolic pathways in plants*,” Bioinformatics Seminar, Department of Statistics, October 17, 2017

ADVISING

Postdoctoral Scientists

Joshua Trujillo, PhD University of Arizona (2019 – Present)
Gregory Gavelis, PhD University of British Columbia (2019 – Present)
Amanda Pendleton, PhD University of Florida (2019 – Present)

Graduate Students

Robert Auber, Purdue University (2017 – Present)
Henry Jones Jebasingh Elilarasu, Purdue University (Spring 2018; now employed at Microsoft)

Undergraduate Students

Madeline Powers, Purdue University (2019 – Present)
Timothy Petzel, Purdue University exchange student from Heinrich Heine University, Dusseldorf, Germany (2018)
Paige Lippens, Purdue University (2018 – 2019)
Alexander T. Borowsky, Vanderbilt University (2015-2017; now graduate student, University of California Riverside)
Sean B. King, Vanderbilt University (2014-2016; now graduate student, Princeton University)
Roland Zonai, Vanderbilt University (2014; Vanderbilt International Summer Research Academy student, now masters student, Karolinska Institutet)
George H. Greene, Vanderbilt University (2014; now graduate student, Duke University)

TEACHING

2019 BCHM 495 Comparative Genomics

Guest Lectures

- 2018 Regulation of Eukaryotic Gene Expression, Guest Lecturer on “*Comparative Genomics?*”, Purdue University
- 2017 Fundamentals of Plant Classification, Guest Lecturer on “*Plant Phylogenetics?*”, Purdue University
- 2013 Genome Science, Guest Lecturer on “*Eukaryotic Genome Diversity?*” & “*Genome Visualization Practical?*”, Vanderbilt University
- 2012 Quantitative Evolutionary and Comparative Genomics: Genomic Responses to Selection, Invited Tutor, Okinawa Institute of Science and Technology
- 2012 Human Genetics and Evolution, Graduate Teaching Assistant (Discussion Leader), University of Arizona
- 2011 Functional Genomics, Graduate Teaching Assistant (Laboratory Instructor), University of Arizona
- 2008 Marine Biology, Graduate Teaching Assistant (Laboratory Instructor), University of Arizona
- 2007 Ecology, Graduate Teaching Assistant (Laboratory Instructor), University of Arizona

SERVICE

Manuscript reviewer Nature Communications, The Plant Cell, Current Microbiology, Evolution Letters, Genes Genomes Genetics, Molecular Biology and Evolution, Eukaryotic Cell, Evolution, PeerJ, PLOS ONE, Fungal Genetics and Biology, BMC Genomics, BMC Evolutionary Biology, New Phytologist

Grant reviewer ESF (EU), Center for Plant Biology (Purdue), AgSEED (Purdue)

Committees Department of Biochemistry, Graduate Admissions & Recruitment Committee: 12/2017 – Present

Department of Biochemistry, Strategic Planning Committees (Graduate Program & Global, National Leader, Measure of Excellence Sub Committees): 01/2018 – Present

Agricultural Faculty Agenda and Policy Committee: 03/2018 – Present

Post-doctoral liaison to the Graduate Student Association, Biological Sciences, Vanderbilt University, 2014-2015

Graduate student representative, Department of Ecology and Evolutionary Biology, University of Arizona, 2010-2011

Prospective student week, Department of Ecology and Evolutionary Biology, University of Arizona, 2010

Academic program review committee, Department of Ecology and Evolutionary, University of Arizona, 2009-2010

Outreach Horizons faculty mentor for first-generation college students, 2017
 “*How do metabolic pathways evolve?*” presentation to the Biochemistry Club, October 18th, 2017

Guest Lecturer, The School for Science and Math at Vanderbilt, 2013-2016

Undergraduate Biology Research poster session judge, University of Arizona,
2012