

CURRICULUM VITA

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Education:

Ph.D. (biology), Stanford University, Molecular genetic analysis of cell separation during *Arabidopsis thaliana* pollen development, 1998

B.A. (biology), Swarthmore College, 1992

Employment:

Senior Staff Scientist, Department of Plant Biology, Carnegie Institution for Science, 2018-Present

Acting Director, Department of Plant Biology, Carnegie Institution for Science, 2016-2018

Staff Scientist, Department of Plant Biology, Carnegie Institution for Science, 2005-2016

Staff Associate, Department of Plant Biology, Carnegie Institution for Science, 1999-2005

Founding Director, the *Arabidopsis* Information Resource (TAIR), Department of Plant Biology, Carnegie Institution for Science, 1999-2005

Database Curator, *Arabidopsis thaliana* Database (AtDB), Dept of Genetics, Stanford University, 1998-1999

Independent Science Education Film Producer, Celadon Films, 1998-1999

Research Associate, Department of Plant Biology, Carnegie Institution for Science, 1994-1998

Research Associate, Department of Biochemistry, Stanford University, 1993-1994

Research Assistant, Biology Department, Swarthmore College, 1990-1992

Research Intern, Johns Hopkins University School of Medicine, 1990 (summer)

Professional Services:

Scientific Advisory Boards:

DOE Biological and Environmental Research Advisory Committee's Subcommittee Working Group on Biodesign (2021-2022); Committee of Visitors, DOE Biological Systems Science Division (2021); Steering Committee, Plant Cell Atlas (2021-2026); Advisory Committee, Joint Genome Institute (2020-present); Advisory Committee, Gene Ontology Consortium (2019-present); Scientific Advisory Board, Phyllos, Inc. (2018-present); ASPB Award Nominations Committee (2018-present); Advisory Committee, IMPB conference (2018); Scientific Advisory Board, VIB Department of Plant Systems Biology, Belgium (2016-present); Scientific Advisory Committee, Joint Genome Institute's Plant Group (2015-present); Scientific Advisor Board, Protein Data Bank (2009-present); Advisor, Program for International Consortia and Collaboration on Agribioinformatics in National Agricultural Genome Program (PICCAN) in Korea (2016-2017); Advisor, NSF C3-C4 Photosynthesis Project (2012-2013); Member, Nominating Committee for the International Society of Biocuration's Executive Committee (2009-2010); Member, Nominating Committee for Plant Cyberinfrastructure Board of Directors (2007); Scientific Advisory Committee, Value-directed Evolutionary Genomics Initiative (VEGI) (2010-2014); Scientific Advisory Committee, CropLink Global Database (2006-2009); Steering Committee Member, International Solanaceae Genome Initiative (2004-2008); Scientific Advisory Board, Saccharomyces Genome Database (SGD) (2003-2006); Scientific Advisory Board, GrainGenes (2003-2006); Scientific Advisory Board, Cornell Genomics (2002-2006); Scientific Advisory Committee, ChromDB (2001-2004)

Grant Review Boards:

DOE (2018); NSF (2021, 2020, 2018, 2016, 2015, 2014, 2012, 2011, 2008, 2006); USDA-ARS (2002); NHGRI (2002)

International Conference Organization Boards:

Lead organizer, First Plant Cell Atlas Symposium (2021); Co-organizer, JGI Plant Secondary Metabolite Workshop (2021); Scientific Organizing Committee, VIB conference Plant Science for Climate Emergency

(2021); Lead organizer, First Plant Cell Atlas Workshop (2020); Co-organizer, 2nd Plant Systems Biology Conference (2020); Co-organizer, Plant Genomes, Systems Biology, and Engineering Conference at Cold Spring Harbor Laboratory (2021, 2019, 2017); Co-organizer, Forth Conference of International Society for Biocuration (2010); Lead organizer, Second International Biocurators meeting (2007); Co-organizer, Solanaceae Genomics meeting (2007); Lead organizer, First International Biocurators Conference (2005); Co-organizer, NSF sponsored workshop on 'National Plant Synthesis Center' (2005)

Scientific Journal Editorial Boards:

Advisory Editor, Plant & Cell Physiology (2020-2023); *In silico* Plants Editorial Board (2018-present); Associate Editor, Molecular Plant (2014-2019); Monitoring Editor, Plant Physiology (2002-2008, 2013-2016, 2021)

Carnegie Institution for Science Services:

Deputy Organizer for Carnegie Workshop on Genomes to Ecosystems (2019); Faculty Advisor for Intrinsically Disordered Proteins Scientific Interest Group (2018-present); Faculty Advisor for DPB Website (2019); Carnegie's Center for Scientific Computation Committee (2014-2016); Carnegie Summer Internship Program Coordination (2013-2016); DPB IT Committee (2012-2016); Departmental Website Design (2010); Carnegie Seminar Organization (2008-2010); Departmental Website Design (2002); Internal Seminar Series Initiation and Organization (2000-2001)

Teaching:

Fundamentals and Frontiers in Plant Biology (BIO129/229) (2020, 2022); Career Exploration & Planning (BIO380) (2019); Carnegie Writing Workshop (2018, 2019); Networks in Biology (Freshmen Seminar) (2010, 2012)

Awards:

NSF Predoctoral Fellowship (1993-1996); NSF/DOE/USDA Plant Training Grant Fellowship (1992-1993); Sigma Xi National Society (1991-1992); Howard Hughes Undergraduate Research Fellowship (1990-1991); National Honors Society (1988)

Scientific Society Memberships:

American Society of Plant Biologists (2010-present); International Society of Biocuration (2010-present); American Chemical Society (2014-present); Society for the Study of Evolution (2014-present); Society of Molecular Biology and Evolution (2014-present); Genetics Society of America (2014-present); International Society for Computational Biology (2015-present); California Native Plant Society (2015-present); Northern California Science Writers Association (2016-present); American Society of Cell Biologists (2016-present); American Geophysical Union (2019-present)

Contribution to Science:

1. My early work in graduate school focused on understanding how plant cells separate, which is very rare because plant cells are connected by cell walls. However, cell separation occurs during male gametogenesis in many plants to create individual pollen grains. Through molecular genetics, cell biological, and biochemical approaches, I identified a class of mutants called *quartet*, which are required for cell separation, and subsequently determined the molecular nature of the defects through gene cloning and molecular and biochemical characterization. Using immunolocalization and biochemical analyses, I showed that the phenotype resulted from defects in degrading the temporary cell wall before the secondary cell wall is deposited from the maternal tissue. I then cloned one of the genes, which encoded a pectin methylesterase, the first cell wall degrading enzyme with a demonstrated function *in vivo*. The *quartet* strains are still the *de facto* lines for plant scientists to study a variety of topics including gametophytic function, meiotic drive, genome stability, and centromere mapping. The strains have been used to map Arabidopsis centromeres, which was instrumental in refining the physical map and completing the genome sequencing. In the future, these strains could enable the creation of artificial plant chromosomes.

- Preuss D, Rhee SY, and Davis RW. (1994) Tetrad analysis possible in *Arabidopsis* with mutation of the QUARTET (QRT) genes. **Science** 264(5164):1458-60.
- Rhee SY and Somerville CR. (1998) Tetrad pollen formation in quartet mutants of *Arabidopsis thaliana* is associated with persistence of pectic polysaccharides of the pollen mother cell wall. **Plant Journal** 15(1):79-88.
- Rhee SY, Osborne E, Poindexter P, and Somerville, CR (2003) Microspore separation in the *quartet 3* mutants of *Arabidopsis* is impaired by a defect in a developmentally regulated pectinase required for pollen mother cell degradation. **Plant Physiology** 133(3):1170-80.

2. As genome sequencing became feasible towards the end of my graduate work, I became interested in the possibility of genome-enabled biology to understand the functions of all genes and pathways encoded in a genome and elucidate how organisms are hard- and soft-wired. As an early career investigator at Carnegie, I led a team of biologists and software engineers to create a computational infrastructure called the Arabidopsis Information Resource (TAIR) to collect and encode all available genomic and literature data to be computable by algorithms and easily accessible by researchers. TAIR has been a primer for revolutionizing plant research by enabling systematic and quantitative analyses of biological functions and pathways. Some 20,000 scientists around the world are still actively using it. In addition, my group was one of the early developers of the Gene Ontology (GO) system where we contributed to making the system to work for plant genomes. GO is a shared, controlled and structured vocabulary for describing gene attributes. GO has been instrumental in analyzing and interpreting genomic and post-genomic data across many organisms and has been used to analyze data in thousands of research articles, including many studies of various human diseases.

The Gene Ontology Consortium (2001) Creating the Gene Ontology Resource: Design and Implementation. **Genome Research** 11(8):1425-1433.

Rhee SY, Beavis W, Berardini TZ, Chen G, Dixon D, Doyle A, Garcia-Hernandez M, Huala E, Lander G, Montoya M, Miller N, Mueller LA, Mundodi S, Reiser L, Tacklind J, Weems DC, Wu Y, Xu I, Yoo D, Yoon J, Zhang P. (2003) The Arabidopsis Information Resource (TAIR): a model organism database providing a centralized, curated gateway to Arabidopsis biology, research materials and community. **Nucleic Acids Research** 31(1):224-228.

Howe D, Costanzo M, Fey P, Gojobori T, Hannick L, Hide W, Hill DP, Kania R, Schaeffer M, St. Pierre S, Twigger S, White O, and Rhee SY (2008) The future of biocuration. **Nature** 455:47-50.

3. One of the biggest problems facing biology in the post-genome era is that we still do not know the functions of many genes (25%-75% of protein-encoding genes are not even predictable for their function based on sequence similarity), even for intensively studied organisms such as *E. coli*, yeast, and human. To systematically infer functions of genes and group them into pathways, my group collaborated with Dr. Ed Marcotte's group to create the first plant genome-wide co-function network called AraNet. It can be used to systematically identify new genes in pathways and infer functions of uncharacterized genes based on the functions of their network neighbors. In addition to contributing to the design and analysis of the network, my group demonstrated that AraNet could be used successfully to guide the functional identification of novel genes. Using molecular genetic approaches, we discovered novel regulators of drought resistance and lateral root development, traits that are essential in engineering drought resistance in plants.

Membrane proteins are perhaps the darkest matter in the pool of uncharacterized proteins because of the difficulty of working with them biochemically and expressing them heterologously. To better understand how proteins function across and within membranes, my group collaborated with Dr. Wolf Frommer's group to develop high-throughput experimental and computational pipelines to systematically identify interactions between membrane proteins and signaling proteins, testing over 6 million binary interactions between 3000 proteins. To date, this is still the largest eukaryotic membrane protein interaction network (such a network previously existed only for yeast, at ~10% of the scale). I led the bioinformatics component of the project where we created a computational pipeline to enable the large-scale experimental pipeline (primer design, sequence validation, and image and statistical analyses of the interactions) and analyzed the resulting protein interaction network. This is

a foundational resource for generating many new hypotheses. The vast majority of the membrane protein interactions we found had never before been identified. In addition, the methods we developed for generating high-throughput membrane protein interactions are applicable to any species and the datasets will be useful in identifying patterns of signaling and regulation in plants.

Lee I, Ambaru B, Thakkar P, Marcotte E, and Rhee SY (2010) Rational association of genes with traits using a genome-scale gene network for *Arabidopsis thaliana*. **Nature Biotechnology** 2(28):149-156.

Jones AM, Xuan Y, Xu M, Wang R-S, Ho C-H, Lalonde S, You CH, Sardi MI, Parsa SA, Smith-Valle E, Su T, Frazer KA, Pilot G, Pratelli R, Grossmann G, Acharya BR, Hu HC, Engineer C, Villiers F, Ju C, Takeda K, Su Z, Dong Q, Assmann SM, Chen J, Kwak JM, Schroeder JI, Albert R, Rhee SY, and Frommer WB (2014) Border control – a membrane-linked interactome of *Arabidopsis*. (2014) **Science** 344:711-716.

Bossi F, Fan J, Xiao J, Chandra L, Shen M, Dorone Y, Wagner D, Rhee SY (2017) Systematic discovery of novel eukaryotic transcriptional regulators using sequence homology independent prediction. **BMC Genomics** 18(1):480

Dorone Y, Boeynaems S, Jin B, Bossi F, Flores E, Lazarus E, Michiels E, De Decker M, Baatsen P, Holehouse AS, Sukenik S, Gitler AD, Rhee SY (2020) Hydration-dependent phase separation of a prion-like protein regulates seed germination during water stress. **Cell Accepted**. bioRxiv 2020.08.07.242172; doi: <https://doi.org/10.1101/2020.08.07.242172>

4. Plant metabolism plays a vital role in the health and well-being of our society. Despite our dependence on plants for energy, nutrition, and medicine, plant metabolism remains a surprisingly understudied field. For example, more than 30% of all pharmaceuticals are based on plant natural products, yet our knowledge of plant metabolic pathways accounts for less than 0.1% of the metabolites thought to exist in flowering plants. Understanding how plants evolved this prodigious chemical vocabulary has been a longstanding goal in plant biology. My group developed computational pipelines that systematically annotate enzyme function on the genome-scale. Using this system, we created a unique, unified resource of plant metabolic networks and discovered several properties that illustrate the differential evolution of secondary metabolism, permitting elucidation of novel secondary metabolic pathways. This opportunity is particularly relevant because secondary metabolites often confer upon plants the ability to survive major biotic and abiotic threats, and are the major sources of medicine, fragrance, and flavor. Thus, the molecular components involved in the production of secondary metabolites are a source of great interest across many fields of research, including agricultural biotechnology, synthetic biology, and biomedical and pharmaceutical research.

Mueller LA, Zhang P, and Rhee SY (2003) AraCyc. A Biochemical Pathway Database for *Arabidopsis*. **Plant Physiology** 132(2):453-60.

Zhang P, Dreher K, Karthikeyan A, Chi A, Pujar A, Caspi R, Karp P, Kirkup V, Latendresse M, Lee C, Mueller LA, Muller R, and Rhee SY (2010) Creation of a Genome-Wide Metabolic Pathway Database for *Populus trichocarpa* Using a New Approach for Reconstruction and Curation of Metabolic Pathways for Plants. **Plant Physiology** 153(4):1479-91.

Chae L, Kim T, Dreher K, and Rhee SY (2014) Genomic signatures of specialized metabolism in plants. **Science** 344:510-513

Schalpfer P, Zhang P, Chuan W, Kim T, Banf M, Chae L, Dreher K, Arvind C, Nilo-Poyanco R, Bernard T, Kahn D, and Rhee SY (2017) Genome-wide prediction of metabolic enzymes, pathways, and gene clusters in plants. **Plant Physiology** 173(4):2041-2059

5. Transcriptional regulation is a fundamental process in biology and has been the subject of an intensive study. However, molecular, genetic, and evolutionary studies suggest that there must be additional layers of control that have not been discovered. To investigate into one of such layers, we used an integrated approach (applying concepts, data, and tools from computer science, genetics, genomics, proteomics, molecular evolution, development, and stress physiology) to uncover a new layer of transcriptional regulation across many domains of life. There are a handful of anecdotal examples of transcription factor-like proteins without a DNA binding

domain, coined microProteins (miPs), which regulate evolutionarily related transcription factors. To test the prevalence of this mechanism, my group developed a genome-scale platform to discover, classify, and validate microProteins in Arabidopsis. We found over 400 putative miPs in Arabidopsis along with their putative target transcription factors and their respective biological pathways. In collaboration with experimental biologists at Carnegie and Stanford, we experimentally validated two novel miPs and their predicted target transcription factors using genetic, molecular, and biochemical experiments as a proof-of-concept. Given the prevalence of miPs in Arabidopsis, we applied the same strategy to predict miPs from 19 species, ranging from microbes to plants and metazoans. We detected putative miPs in all organisms examined and paired them with potential targets in almost all known transcription factor families. Our analysis suggests a potential ubiquitous layer of transcriptional regulation by miPs and provides a systematic framework for their future study. The potential universality of miP function may offer new tools to modulate transcription factor function in practical applications ranging from gene therapy to bioengineering.

Magnani E, De Klein N, Nam H-I, Kim J-G, Pham KL, Fiume E, Mudgett MB, and Rhee SY (2014) A comprehensive analysis of microProteins reveals their potentially widespread mechanism of transcriptional regulation. **Plant Physiology** 165(1):149-15.

Banf M and Rhee SY (2017) Enhancing gene regulatory network inference through data integration with markov random fields. **Nature Scientific Reports** 7:41174

Zhao K and Rhee SY (2019) Epigenomic Landscape of *Arabidopsis thaliana* Metabolism Reveals Bivalent Chromatin on Specialized Metabolic Genes. *Under revision*. **bioRxiv** 589036; doi: <https://doi.org/10.1101/589036>

6. To supercharge our ability to understand how plants work, we need to quantitatively understand the dynamic molecular organization of plant cells and their functions. For this, we need a solid infrastructure that can incorporate and codify the theoretical and empirical data of plant cells, a task too big to tackle for a single group. Therefore, we want to create a community that includes scientists from plant biology, data science, AI, imaging, proteomics, single cell profiling and nanotechnology to lay the groundwork for creating a comprehensive understanding of the dynamic molecular organization of the plant cell, an initiative we are calling the [Plant Cell Atlas](#) (PCA). We have successfully kickstarted the PCA community building activities this spring with three digital workshops on the vision, technologies and broader impacts of the PCA. Because of COVID-19, our original plan for an in person gathering of 70 scientists, mostly senior faculty, turned into three virtual workshops, each of which drew over 400 scientists (70% early career) participating from around the world.

Plant Cell Atlas Consortium, Ghosh Jha S, Borowsky AT, Cole BJ, Fahlgren N, Farmer A, Huang SC, Karia P, Libault M, Provart NJ, Rice SL, Saura-Sanchez M, Agarwal P, Ahkami AH, Anderton CR, Briggs SP, Brophy JAN, Denolf P, Di Costanzo LF, Exposito-Alonso M, Giacomello S, Gomez-Cano F, Kaufmann K, Ko DK, Kumar S, Malkovskiy AV, Nakayama N, Obata T, Otegui MS, Palfalvi G, Quezada-Rodríguez EH, Singh R, Uhrig RG, Waese J, Van Wijk K, Wright RC, Ehrhardt DW, Birnbaum KD, Rhee SY (2021) Vision, challenges and opportunities for a Plant Cell Atlas. **eLife** *In press*. DOI: [10.7554/eLife.66877](https://doi.org/10.7554/eLife.66877)

Eckelbarger M, Rice S, Osano A, Peng J, Ullah H, Rhee SY (2021) Recognizing Pioneering Black Plant Biologists in Our Schools and Society. **Trends in Plant Science** <http://doi.org/10.1016/j.tplants.2021.07.021>

Rice S, Fryer E, Jha SG, Malkovskiy A, Meyer H, Thomas J, Weizbauer R, Zhao K, Birnbaum KD, Ehrhardt DW, Wang Z, Rhee SY, and The Plant Cell Atlas Consortium (2020) First Plant Cell Atlas Workshop Report. **Plant Direct** 00: 1– 10. <https://doi.org/10.1002/pld3.271>

Rhee SY, Birnbaum KD, Ehrhardt DW (2019) Towards Building a Plant Cell Atlas. **Trends in Plant Science** 24(4):303-310

Invited Seminars:

1. York University, York, UK (2000); 2. The Institute for Genome Research (2000); 3. Oxford University, Oxford, UK (2000); 4. Lorne Genome Conference, Melbourne, Australia (2001); 5. University of Arizona, Tucson, AZ (2001); 6. Plant Gene Expression Center, Albany, CA (2001); 7. Entigen, Sydney, Australia (2001); 8. Cornell

University, Ithaca, NY (2001); 9. Seoul National University, Seoul, South Korea (2001); 10. University of California at Riverside, Riverside, CA (2002); 11. University of Guelf, Guelf, Canada (2002); 12. VIB, University of Gent, Gent, Belgium (2003); 13. Seoul National University, Seoul, South Korea (2004); 14. University of Missouri, Columbia (2004); 15. Plant Gene Expression Center, Albany, CA (2004); 16. Iowa State University (2007); 17. U.C. Riverside (2007); 18. University of Calgary, Canada (2007); 19. National Research Center-Plant Biotechnology Institute, Saskatoon, Canada (2007); 20. Danforth Center, MO (2007); 21. Dow Agrosciences (2010); 22. U.C. Riverside (2010); 23. U. Florida (2011); 24. Michigan State U. (2011); 25. Danforth Center (2012); 26. National Cheng Kung U., Taiwan (2012); 27. UC Davis (May 2013); 28. Washington State U. (April 2013); 29. University of Missouri-Columbia (Oct 22, 2013); 30. San Francisco State University (April 23, 2015); 31. Second Genome (Nov 9, 2015); 32. Louisiana State U. (Feb 22, 2016); 33. Plant Gene Expression Center, Albany CA (March 10, 2016); 34. Langebio, the National Laboratory of Genomics for Biodiversity, Mexico (May 10, 2016); 35. VIB, Ghent, Belgium (Sept 17, 2018); 36. U. Maryland at College Park (Nov 15, 2018); 37. Danforth Center (May 2019); 38. ASPB / Plantae Global Virtual Plant Research Seminar Series (June 16, 2020); 39. U. Kentucky (Nov 12, 2020); 40. Washington State U. (Dec 17, 2020); 41. Williams College (April 9, 2021); 42. EMSL (Aug 17, 2021); 43. UC Riverside (Nov 10, 2021); 44. Washington State U (Feb 7, 2022)

Invited Symposia:

1. Agricultural Genomics Conference, San Diego, CA (1999); 2. Advances in Genomic Research, Potentials and Applications, San Francisco State University, SF, CA (1999); 3. Genomic *Arabidopsis* Resource Network Workshop, York, UK (2000); 4. NSF Workshop on U.S.-Australia Interactions, Washington D.C. (2000); 5. AAAS Annual Meeting, San Francisco, CA (2001); 6. Plant & Animal Genome IX Conference, San Diego, CA (2001); 7. Mini-symposium on Plant Bioinformatics, KRIBB, Daejeon, South Korea (2001); 8. Plant Genome Awardees Meeting, San Diego, CA (2002); 9. Future of the National Plant Genome Initiative, National Academy of Sciences, Washington DC (2002); 10. National Science Foundation Managing Plant Genomic Resources Workshop, Asilomar, CA (2002); 11. International Horticultural Congress, Toronto, Canada (2002); 12. 2nd International Conference on Plant Metabolomics, Potsdam, Germany (2003); 13. Digital Archives for Science & Engineering Resources (DASER) Symposium (2003); 14. Crop Functional Genomics (2004); 15. 7th International Plant Cold Hardiness Symposium (2004); 16. Solanaceae Genomics Meeting, Jeju Island, S. Korea (2007); 17. Korea Genome Organization Meeting, Seoul, S. Korea (2007); 18. iPlant Kick-off Conference, Cold Spring Harbor Labs, NY (2008); 19. American Society of Plant Biologists Conference, Merida, Mexico (2008); 20. Banff Plant Metabolism Conference, Banff, Canada (2008); 21. International Conference on *Arabidopsis* Research (2010); 22. A Current Opinion Conference on Plant Genome Research, Amsterdam, the Netherlands (2011); 23. Alliance of Independent Plant Institutes Meeting, St. Louis, MO (2011); 24. ASMS Asilomar Conference on Mass Spectrometry, Asilomar, CA (2011); 25. Phenotype Ontology RCN, NASCent, Durham, NC (2012); 26. Plant Genomics in China XIII, Tai'an, China (2012); 27. Microbial and Plant Genomics Institute (MPGI) Symposium on Systems Biology of Genetic Regulation, St. Paul, MN (2012); 28. International Symposium on Root Systems Biology, Taipei, Taiwan (2012); 29. Evolution of Metabolic Diversity, Banbury, NY (March 2013); 30. Alliance of Independent Plant Institutes Meeting, Ithaca, NY (May 2013); 31. Plants and People Conference, Berlin, Germany (June 2013); 32. Meeting on the Genetic Basis of Unintended Effects in Modified Plants, Ottawa, Canada (Jan 14-15, 2014); 33. JGI DOE Conference: "Genomics of Energy and the Environment" (March 24-25, 2015); 34. Penn State Plant Biology Symposium: "Plant Stress-omics in a Changing Climate" (May 13-16, 2015); 35. Molecular Plant Symposium, Beijing, China (Aug 5-8, 2015); 36. Plant Genomes & Biotechnology: From Genes to Networks, CSHL, NY (Dec 2-5, 2015); 37. NAASC RCN: Arabidopsis Research and Training for the 21st century (May 13-15, 2016); 38. ASPB Conference, Plant Cell Symposium: New Biological Insights from Large-Scale Biology, Austin TX (July 9-13, 2016); 39. MSU - Plant Biotechnology for Health and Sustainability Annual Symposium (Oct 26-27, 2017), East Lansing, MI; 40. First International Plant Systems Biology Conference (Sept 10-14, 2018), Roscoff, France; 41. UC Davis Plant Symposium (April 8, 2019); 42. Plants of the Future, NYU NY (June 13-14, 2019); 43. LBNL Single Cell Solutions for Energy and Environment (Jan 23, 2020); 44. DOE BER Genome Science Program Meeting (Feb 23-26, 2020); 45. ASPB 2020 (Jul 25-29, 2020); 46. Australian Bioinformatics and Computational Biology Society Conference 2020 (Keynote, Nov 24-26, 2020); 47. Cornell University Plant Breeding Symposium (April 23, 2021); 48. Cell Atlas workshop at EMBL-EBI Industry

Programme (May 12-13, 2021); 49. The American Society of Pharmacognosy 2021 Annual Meeting, Grand Rapids MI (Plenary, July 24-28, 2021-Cancelled due to COVID19)

PEER REVIEWED PUBLICATIONS

- Plant Cell Atlas Consortium, Ghosh Jha S, Borowsky AT, Cole BJ, Fahlgren N, Farmer A, Huang SC, Karia P, Libault M, Provart NJ, Rice SL, Saura-Sanchez M, Agarwal P, Ahkami AH, Anderton CR, Briggs SP, Brophy JAN, Denolf P, Di Costanzo LF, Exposito-Alonso M, Giacomello S, Gomez-Cano F, Kaufmann K, Ko DK, Kumar S, Malkovskiy AV, Nakayama N, Obata T, Otegui MS, Palfalvi G, Quezada-Rodríguez EH, Singh R, Uhrig RG, Waese J, Van Wijk K, Wright RC, Ehrhardt DW, Birnbaum KD, Rhee SY (2021) Vision, challenges and opportunities for a Plant Cell Atlas. **eLife** *In press*. DOI: [10.7554/eLife.66877](https://doi.org/10.7554/eLife.66877)
- Hawkins C, Ginzburg D, Zhao K, Dwyer W, Xue B, Xu A, Rice S, Cole B, Paley S, Karp P, and Rhee SY (2021) Plant Metabolic Network: A comprehensive resource of plant metabolic information. **Journal of Integrated Plant Biology** *In press*. <https://doi.org/10.1111/jipb.13163>
- Eckelbarger M, Rice S, Osano A, Peng J, Ullah H, Rhee SY (2021) Recognizing Pioneering Black Plant Biologists in Our Schools and Society. **Trends in Plant Science** <http://doi.org/10.1016/j.tplants.2021.07.021>
- Cole B, Bergmann D, Blaby-Haas C, Blaby I, Bouchard K, Brady S, Ciobanu D, Coleman-Derr D, Leiboff S, Mortimer J, Nobori T, Rhee SY, Schmutz J, Simmons BA Singh A, Sinha N, Vogel J, O'Malley R, Visel A, Dickel D (2021) Plant Single-Cell Solutions for Energy and the Environment. **Communications Biology** 4:962.
- Dorone Y, Boeynaems S, Jin B, Bossi F, Flores E, Lazarus E, Michiels E, De Decker M, Baatsen P, Holehouse AS, Sukenik S, Gitler AD, Rhee SY (2021) Hydration-dependent phase separation of a prion-like protein regulates seed germination during water stress. *bioRxiv* 2020.08.07.242172; doi: <https://doi.org/10.1101/2020.08.07.242172> **Cell** 184(16), 4284-4298.e27 [highlighted by Developmental Cell, PNAS, Nature Chemical Biology, F1000, Science]
- Demirer GS, Silva TN, Thomas JB, Jackson CT, Ehrhardt DW, Rhee SY, Mortimer JC, and Landry MP (2021) Nanotechnology to advance CRISPR/Cas genetic engineering of plants. **Nature Nanotechnology** 16, 243–250.
- Kang S-H, Pandey RP, Lee C-M, Jeong J-T, Choi B-S, Sim JS, Jung M, Won SY, Oh T-J, Yu Y, Lee OK, Kim HH, Lee T-H, Kim N-H, Bashyal P, Kim T-S, Kim C-K, Kim J-S, Ahn B-O, Rhee SY, Sohng JK (2020) Genome-enabled discovery of anthraquinone biosynthesis in *Senna tora*. **bioRxiv** doi: <https://doi.org/10.1101/2020.04.27.063495> **Nature Communications** 11, 5875. <https://doi.org/10.1038/s41467-020-19681-1>
- Rice S, Fryer E, Jha SG, Malkovskiy A, Meyer H, Thomas J, Weizbauer R, Zhao K, Birnbaum KD, Ehrhardt DW, Wang Z, Rhee SY, and The Plant Cell Atlas Consortium (2020) First Plant Cell Atlas Workshop Report. **Plant Direct** 00: 1– 10. <https://doi.org/10.1002/pld3.271>
- Parry G, Provart NJ, Brady SM, Uzilday B, The Multinational Arabidopsis Steering Committee (2020) Current status of the multinational Arabidopsis community. **Plant Direct** 00:1-9.
- Lin F, Lazarus E, Rhee SY (2020) QTG-Finder2: a generalized machine learning algorithm for prioritizing QTL causal genes in plants. **bioRxiv** doi: <https://doi.org/10.1101/2020.02.03.931444> **Genes|Genomes|Genetics** 10(7): 2411–2421.
- Bouain N, Korte A, Satbhai SB, Rhee SY, Busch W, Rouached H (2019) Systems approaches provide new insights into *Arabidopsis thaliana* root growth under mineral nutrient limitation. **bioRxiv** 460360; doi: <https://doi.org/10.1101/460360> **PLOS Genetics** 6;15(11):e1008392.
- Rhee SY, Birnbaum KD, Ehrhardt DW (2019) Towards Building a Plant Cell Atlas. **Trends in Plant Science** 24(4):303-310
- Banf M, Zhao K, Rhee SY (2019) METACLUSTER - an R package for context-specific functionality analysis of metabolic gene clusters. **Bioinformatics** btz021, <https://doi.org/10.1093/bioinformatics/btz021>
- Lin F, Fan J, Rhee SY (2018) QTG-Finder: a machine-learning algorithm to prioritize causal genes of quantitative trait loci in plants. **bioRxiv** 484204; doi: <https://doi.org/10.1101/484204> **Genes|Genomes|Genetics** 9(10):3129-3138.

- Friesner J, Assmann SM, Bastow R, Bailey-Serres J, Beynon J, Brendel V, Buell CR, Bucksch A, Busch W, Demura T, Dinneny JR, Doherty CJ, Eveland AL, Falter-Braun P, Gehan MA, Gonzales M, Grotewold E, Gutierrez R, Kramer U, Krouk G, Ma S, Markelz RJC, Megraw M, Meyers BC, Murray JAH, Provart NJ, Rhee SY, Smith R, Spalding EP, Taylor C, Teal TK, Torii KU, Town C, Vaughn M, Vierstra R, Ware D, Wilkins O, Williams C, Brady SM (2017) The Next Generation of Training for Arabidopsis Researchers: Bioinformatics and Quantitative Biology. **Plant Physiol.** 175(4):1499-1509. doi: 10.1104/pp.17.01490. PubMed PMID: 29208732; PubMed Central PMCID: PMC5717721.
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People Trained:

	First Name	Last Name	Title	Start Date	End Date	Present Position
146	Sterling	Field	Postdoc	9/21	-	
145	Purva	Karia	Postdoc	6/21	-	
144	Evan	Saldivar	Grad student	6/21	-	
143	Maxwell	Eckelbarger	Intern RA	10/20 6/21	5/21 -	
142	Olivia	McDonald	RA	9/20	-	
141	Megan	Muffley	Postdoc	8/20	-	
140	Will	Dwyer	RA	6/20	-	
139	Selena	Rice	Biocurator	4/20	-	
138	Danny	Ginszburg	RA	4/20	-	
137	Justin	Krupp	RA	3/20	8/21	
136	Jason	Thomas	Postdoc	3/20	-	
135	Hodan	Farah	Intern	3/20	-	
134	Elena	Lazarus	RA	7/19	-	
133	David	Huang	Intern	6/19	8/19	Undergrad at UCSD

132	Suzie	Lee	Intern	6/19	8/19	Undergrad at Cal Poly
131	Emily	Fryer	RA	3/19	-	
130	Navadeep	Boruah	Postdoc	10/18	7/21	Data Scientist, Bayer Corp
129	Karine	Prado	Postdoc Senior RA	10/18 11/21	10/21 -	
128	Cheng	Zhao	Postdoc	8/18	8/21	Principal Investigator, Agricultural Genomics Institute at Shenzhen, CAS
127	Charles	Hawkins	Curator	8/18	-	
126	Nienke	Besbrugge	Postdoc	8/18	4/19	Unknown
125	Angela	Xu	CA	6/18	3/20	PhD program at Johns Hopkins U
124	Kevin	Radja	RA	6/18	6/20	PhD program at Virginia Tech
123	Ankush	Bharadwaj	Intern	6/18	8/18	UCLA
122	Bharti	Parihar	Intern	6/18	8/18	CSU, East Bay
121	Lyn	Vakulenko	Intern	5/18	8/18	Carlton U, Canada
120	Benjamin	Jin	RA	11/17	7/20	PhD program at UC Santa Barbara
119	Jiun	Yen	Postdoc	10/17	10/19	Software Engineer at Presto
118	Fan	Lin	Postdoc	9/17	2/20	Bioinformatician at Brightseed, Inc.
117	Kangmei	Zhao	Postdoc	7/16	-	
116	Hatem	Rouached	Visiting faculty	2016	2018	Assistant Professor, MSU
115	Sam	Craig	Intern	6/16	8/16	PA High
114	Elena	Estrada	Intern	6/16	8/16	UCSD
113	Nikhil	Kaimal	Intern	6/16 6/17	8/16 8/17	UC Davis
112	JeaneAe	Kim	RA	2/16	7/17	PhD candidate, UC Riverside
111	Arvind	Chavali	Postdoc	1/16	3/18	Strategy consultant, ZS Associates
110	Bo	Xu	Intern RA	9/15 2/16	1/15 -	Bioinformatics RA, Carnegie
109	Dylan	Koh	Intern	6/15	8/15	Stanford
108	Vivek	Sriram	Intern	6/15	8/15	Duke U.
107	JeanAe	Kim	Intern	6/15	1/16	PhD candidate at UC Riverside
106	Luong	Mai	Intern	6/15	12/15	Cornell U.
105	Yanniv	Dorone	Ph.D. student Postdoc	9/15 1/21	12/20 -	Consultant, AgFunder Ventures
104	Pascal	Schläpfer	Postdoc	8/14	12/17	Group leader at ETH
103	In-Seob	Han	Visiting faculty	2014	2015	U Ulsan, Korea
102	Jenny	Guarino	Intern	5/14	8/14	Cornell
101	Phong	Nguyen	Intern RA	5/14 9/14	8/14 5/15	Developer at Parallax Volatility Advisers, LP
100	Michael	Banf	Postdoc	1/14	2/17	Senior Machine Learning Engineer at fabforce GmbHs
99	Catherine	Doyle	Intern	6/13	8/13	PhD candidate at NC State
98	Jue	Fan	Postdoc	5/13	3/15	Bioinformatics Director, IsoTex
97	Lessley	Peterson	Intern	1/13	10/13	U. Maryland
96	Bernie	Hauser	Visiting faculty	2013	2014	U Floria at Gainesville, USA

95	Chuan	Wang	Postdoc	10/12	2/16	Senior Bioinformatics Scientist, Brightseed
94	Lan	Jiang	Intern	10/12	2/13	Unknown
93	Lilyana	Chandra	Intern	6/12	12/12	QA Analyst at American Medical Systems
92	Varun	Dwaraka	Intern	7/12	9/12	PhD candidate, UC Santa Cruz
91	Mohan	Avula	Intern	6/12	8/12	Los Altos HS
90	Jim	Guo	Postdoc	7/12	3/15	Staff Scientist, Bioinformatics at the Clinical NGS group at Thermo Fisher
89	Ricardo	Nilo Poyanco	Postdoc	3/12	5/14	Lecturer at School of Biotechnology, Faculty of Science, U. Mayor, Chile
88	Meng	Xu	Postdoc	11/11	8/14	Director of Bioinformatics, Brightseed
87	Taehyong	Kim	Postdoc	3/11	7/15	Principal bioinformatician, Institute for Biomedical Informatics University of Pennsylvania
86	Tam	Tran	Intern	11/11	8/12	Research associate, Mayo Clinic, Rochester, NY
85	Damian	Priamurskiy	Intern	6/11	3/12	Unknown
84	Caryn	Johansen	Intern	6/11	9/11	PhD candidate at UC Davis
			Intern	7/12	9/12	
			RA	10/12	7/14	
83	Flavia	Bossi	Postdoc Senior RA	2/10 3/18	2/18 -	
82	Hye-In	Nam	RA	1/10	5/19	Unknown
81	Niek	deKlein	Intern	9/10	1/11	PhD candidate, U. Groningen
80	Kris	Sankaran	Intern	9/10	4/11	PhD candidate, Stanford U.
79	Julian	Huang	Intern	6/10	12/10	Med student, Yale
78	Nathaniel	Leu	Intern	6/10	9/10	Medical student, Eastern Virginia Medical School
77	Kim	Pham	Intern	6/10	12/10	Resident Doctor at Creighton University School of Medicine
76	Chang	You	Postdoc	8/09	5/11	Data Science Engineer at MZ
75	Rupa	Paduchuri	Intern	10/09	12/11	Sr. Research Associate at Genentech
74	Jon	Illoreta	Intern	6/09	12/10	Unknown
73	Purva	Karia	Intern	6/09	7/09	PhD candidate, McGill U
				1/11	6/11	
72	Cherise	Lau	Intern	6/09	8/09	UCLA
				7/10	9/10	
71	Vibhu	Bakshi	Intern	3/09	6/09	U. North Texas, Ph.D.
70	Pranjali	Karia	Intern	3/09	11/09	Unknown
69	Azam	Noorani	RA	12/08	8/09	Unknown
68	Sagaya	Arokiasamy	RA	10/08	12/08	Unknown
67	Lee	Chae	Postdoc	7/08	5/14	Cofounder and CTO, Brightseed
66	Ricardo	Leitão	Intern	7/08	1/09	PhD candidate, UCSC
65	Michael	Ahn	Intern	7/08	8/08	Masters, Harvard Grad School of Design
				8/09	8/09	
64	Anjo	Chi	Programmer	1/08	1/10	Unknown
63	AS	Karthikyan	Curator	1/08	11/09	Unknown
62	Kun	He	Postdoc	9/07	12/09	Head of Data Systems, Bayer Crop Science

61	Ozgur	Ozturk	Postdoc	8/07	3/08	Software Architect / Data Scientist at Philips Wellcentive
60	Bindu	Ambaru	RA	7/07	4/10	PhD student, Manipal University, India
59	Joy	Zhang	Intern	6/07	8/07	Unknown
58	Liping	Ji	Postdoc	5/07	5/08	Associate prof, Harbin Inst. Tech.
57	Adeline	Wong	Intern	4/07	9/07	Software Engineer III at Google
56	Suzanne	Fleshman	CA	11/07	2/08	Unknown
55	Kate	Dreher	Curator	11/07	11/13	Germplasm coordinator, CYMMIT
54	Cindy	Lee	Programmer	10/07	7/11	Software Developer at CardioDx
53	Raymond	Chetty	Programmer	10/07	5/10	Unknown
52	Larry	Ploetz	SA	3/07	5/13	Operations Engineer at Pinger
51	Jin	Chen	Postdoc	12/06	8/09	Associate prof, U. Kentucky
50	Phillipe	Lamesch	Curator	12/06	3/12	Communication adviser, Luxembourg Centre for Systems Biomedicine, U. Luxembourg
49	Vanessa	Swing	CA Webmaster	10/06 3/07	3/07 11/09	Environmental Horticulture and Design Student at Foothill College
48	Donghui	Li	Curator	7/06	6/14	Curator, Phoenix Informatics
47	Shanker	Singh	DBA	7/06	3/13	Senior database administrator at Innovative Interfaces
46	John	McGee	Intern	6/06	8/06	Scientific Founder, FogPharma
45	Tom	Meyer	Programmer	6/06	5/10	Software Consultant, Tegular Software
44	Bob	Muller	IT	5/06	6/14	Retired
43	Tom	Walk	Postdoc	1/06	9/07	Large Plant Breeding Database Manager, North Dakota State U.
42	Noah	Whitman	RA	1/06	4/07	Unknown
41	Natasha	Raikhel	Visiting faculty	2006	2006	UC Riverside, USA
40	Mohammed	Shaikh	Programmer	12/05	1/06	Unknown
39	David	Swarbreck	Curator	10/05	9/10	Group leader, Genome Analysis Team, The Genome Analysis Centre, UK
38	Ryan	Pham	Intern	6/05	8/05	
37	Dan	MacLean	Postdoc	5/05	6/06	Director of bioinformatics, Sainsbury labs, UK
36	Joe	Filla	SA	2/05	3/07	Director of Operations, QuinStreet
35	Christophe	Tissier	Curator	1/05	9/07	Project manager, Learning in Motion, Inc.
34	Hartmut	Foerster	Curator	8/04	8/07	Database curator, SGN
33	Chris	Wilks	Intern Programmer	6/04 6/05	5/05 1/11	Graduate student, UCSC
32	Jon	Slenk	Programmer	4/05	7/06	Software Engineer, Apple
31	Aleksey	Kleytman	CA	2/5	6/6	Tech support
30	Renee	Halbrook	Intern	6/04	8/04	Mom
29	Doug	Becker	Programmer	5/04	4/06	Technical Accountant Manager, NetApp
28	Katica	Ilic	Curator	1/04	10/06	Senior scientist, Fluidigm Corporation
27	Jessie	Zhang	Programmer	9/03	5/04	Unknown
26	Brandon	Zoeckler	CA	8/03	3/6	Research technician, UC Berkeley
25	Thomas	Yan	Intern	7/03	6/06	Senior staff engineer, SanDisk

24	Behzad	Mahini	Programmer	3/03	1/04	Unknown
23	Shijun	Li	Postdoc	10/02	10/05	QC analyst, ThermoFisher
22	Yigong	Lou	Postdoc	9/02	10/04	Bioinformatics analyst, LBL
21	Nick	Moseyko	Curator	9/02	10/05	Bioinformatics analyst, UC Berkeley
20	Gabriel	Lander	CA	8/02	3/03	Assistant professor, Scripps Institute
19	Peifen	Zhang	Curator	4/02	7/18	Curator, TAIR, Pheonix Informatics Inc.
18	Suparna	Mundodi	Curator	3/02	5/06	Bioinformatics analyst, Biorad Inc.
17	Tanya	Berardini	Curator	1/02	6/14	Curator, Phoenix Informatics
16	Julie	Tacklind	Webmaster	12/01	2/07	Unknown
15	Chunxia	Xu	Programmer	10/01	1/06	Unknown
14	Danny	Yoo	Programmer	6/01	5/06	Software engineer, Google
13	Mark	Lambrecht	Postdoc	4/01	2/02	Director of the Health and Life Sciences Global Practice at SAS
12	Bryan	Murtha	Programmer	2/01	8/01	Unknown
11	Holly	Nottage	Intern	2/01	7/01	Unknown
10	Jill	Larimore	Intern	1/01	4/02	Graduate student, Gladstone Institute, UCSF
9	Aisling	Doyle	CA	11/00	10/02	Biosafety inspector, University College Cork
8	Jungwon	Yoon	CA	9/00	6/03	Unknown
7	Anell	Bengt	Visiting student	9/00	12/01	Software developer, AstraZeneca Inc.
6	Smita	Mitra	Visiting student	8/00	10/00	Software developer, IBM Life Sciences
5	Debika	Bhattacharya	Intern	7/00	8/00	Enterprise architect, Oracle
4	Lukas	Mueller	Curator	6/00	7/03	Associate professor, Cornell University, BTI
3	Leonore	Reiser	Curator	12/99	3/06	Program manager at Breakout Labs, Thiel Foundation
2	Margarita	Garcia-Hernandez	Curator	9/99	12/06	Research scientist, California Department of Health Care Services
1	Eva	Huala	Curator	9/99	8/05	CEO, Phoenix Informatics

Patents Filed:

U.S. Provisional Application No. 63/143,366

Filing Date: January 29, 2021

Modulation of Iron- and Phosphate-Dependent Chlorophyll Accumulations

Inventors: Seung Yoon RHEE, et al.

Your Ref: 5135

KT Ref: 107321-1219474-000100US

U.S. Provisional Patent Application No. 63/063,009

Filed: August 7, 2020

For: FLOE1-MEDIATED MODULATION OF SEED LONGEVITY AND GERMINATION RATES

Stanford Ref.: S20-324

Carnegie Ref.: 5133

KTS Ref.: 079445-1204833-006800US

Research Funding: (Cumulative to Carnegie: \$47,016,888; Cumulative Total: \$141,378,756)

Current Research Grants:

Title: Creating and Fostering the Plant Cell Atlas Community
Funding Organization: NSF RCN (11002)
Dates of Project: 06/1/2021 -- 05/31/2026
Award Amount: \$765,382
PI: Sue Rhee

Title: Interrogating pennycress natural and induced variation to improve abiotic stress tolerance and oilseed bioenergy crop resilience
Funding Organization: Iowa State (DoE): DE-FOA-0002214
Dates of Project: 09/01/20 – 08/31/25
Total Award Amount: \$12,899,996 **Individual Subaward Amount:** \$2,552,804
PI: John Sedbrook

Title: High-throughput determination of a subcellular metabolic network map of plants
Funding Organization: DOE BER (10931)
Dates of Project: 09/15/2019 -- 09/14/2022
Award Amount: \$2,311,477
PI: Sue Rhee

Title: TOOLS-PGR: Computational Infrastructure to Enable High-throughput, High-quality Annotations of Compartmentalized Metabolic Networks for Plant Genomes
Funding Organization: NSF: IOS-1546838 (10708)
Dates of Project: 08/15/16 – 07/31/22
Award Amount: \$2,193,335
PI: Sue Rhee

Title: BASF Participation in the Plant Cell Atlas Initiative
Funding Organization: BASF (BBCC Innovation Center, Belgium) (10952)
Dates of Project: 02/14/20 – 02/13/21
Award Amount: \$10,000
PI: Sue Rhee

Title: Using Systems Approaches to Improve Photosynthesis and Water Use Efficiency in Sorghum
Funding Organization: Danforth (DOE DE-SC0018277). Subaward #: 23021-C (10797)
Dates of Project: 09/15/2017 – 09/14/2022
Total Award Amount: \$16,067,709 **Individual Subaward Amount:** \$1,866,443
PI: Ivan Baxter

Title: NeuroPlant: Leveraging a botanical armamentarium to manipulate the brain (10897)
Funding Organization: Stanford (NSF): # 62019381 - 140753
Dates of Project: 01/01/19 – 12/31/21
Total Award Amount: \$700,000 **Individual Subaward Amount:** \$208,000
PI: Miriam Goodman

Title: Deciphering Life Functions in Extreme Environment
Funding Organization: Venture Grant / Broccoli Charitable Fund. (10877)
Dates of Project: 10/01/18 – 09/30/21
Award Amount: \$60,000

PI: Sue Rhee

Past Research Grants:

Title: Thermo-adaptation of photosynthesis in extremophilic desert plants

Funding Organization: Carnegie (10908)

Dates of Project: 06/01/2019 -- 5/31/2021

Award Amount: \$150,000

PI: Sue Rhee

Title: 1st Workshop on the Plant Cell Atlas Initiative

Funding Organization: NSF (10913)

Dates of Project: 06/01/2019 -- 05/31/2021

Award Amount: \$82,861

PI: Sue Rhee

Title: Prediction and Discovery of Host Metabolites and Metabolic Pathways Required for Proliferation of an Obligate Fungal Biotroph

Funding Organization: UC Berkeley (NSF): MCB-1617020. Subaward #: 00009338 (10722)

Dates of Project: 09/15/2016 – 08/31/2020

Total Award Amount: \$1,891,482 **Individual Subaward Amount:** \$417,893

PI: Mary Wildermuth

Title: Discovery of new molecular pathways for regulating phosphate content in *Arabidopsis thaliana* and *Vitis vinifera* for sustainable food production

Funding Organization: Fondation de France (10649)

Dates of Project: 09/08/2015 – 09/07/2020

Award Amount: \$30,000

PI: Sue Rhee

Title: An Integrated Pipeline for Accelerated Plant Natural Product Discovery (10643)

Funding Organization: Stanford (NIH): 3U01GM110699-02S1. Subaward #: 61066255-112225

Dates of Project: 08/15/2015 – 04/30/2020

Total Award Amount: \$4,491,520.00 **Individual Subaward Amount:** \$924,810

PI: Christina Smolke

Title: A systems-level analysis of drought and density response in the model c4 grass *Setaria viridis*

Funding Organization: Danforth (DOE): DE-SC0008769; 23009-CI (10412)

Dates of Project: 09/01/2012 – 08/31/2018

Total Award Amount: \$12,138,927 **Individual Subaward Amount:** \$2,212,640

PI: Thomas Brutnell

Title: The membrane-based protein Interactome

Funding Organization: NSF: MCB-1052348. (10274)

Dates of Project: 04/15/2011 – 03/31/2016

Award Amount: \$1,834,556

PI: Wolf Frommer

Title: Systematic identification of regulators of transcription factors using computational predictions and high-throughput yeast-one-hybrid assays

Funding Organization: Association of Independent Plant Research Institutes (AIPR) (10383)

Dates of Project: 07/01/2012 – 06/30/2015

Award Amount: \$14,400

PI: Sue Rhee

Title: AIPI Plant Genome Annotation Group

Funding Organization: Association of Independent Plant Research Institutes (AIPI) (10534)

Dates of Project: 03/11/2014 – 02/28/2015

Award Amount: \$25,000

PI: Sue Rhee

Title: *Arabidopsis* 2010: Towards a Comprehensive *Arabidopsis* Protein Interactome Map: Systems Biology of the Membrane Proteins and Signalosome

Funding Organization: NSF: MCB-0618402 (2066)

Dates of Project: 09/01/2006 – 08/31/2011

Award Amount: \$4,799,186

PI: Wolf Frommer

Title: Building a Network of Plant Metabolic Pathway Databases and Communities

Funding Organization: NSF: DBI-0640769 (2098)

Dates of Project: 03/15/2008 – 02/28/2013

Award Amount: \$1,477,869

PI: Sue Rhee

Title: Metabolomics: A Functional Genomics Tool for Deciphering Functions of *Arabidopsis* Genes in the Context of Metabolic and Regulatory Networks

Funding Organization: Iowa State University (NSF): 420-40-71A (10079)

Dates of Project: 03/01/2009 – 02/28/2013

Total Award Amount: \$2,925,398 **Individual Subaward Amount:** \$269,862

PI: Basil Nikolau

Title: TAIR: The *Arabidopsis* Information Resource

Funding Organization: NSF: DBI-0850219 (10107)

Dates of Project: 09/01/2009 – 08/31/2014

Award Amount: \$4,170,595

PI: Eva Huala

Title: TRPGR: Building a Highly Automated Metabolic Pathway Reconstruction Infrastructure for Plants

Funding Organization: NSF: IOS-1026003 (10204)

Dates of Project: 09/01/2010 – 08/31/2016

Award Amount: \$1,825,569

PI: Sue Rhee

Title: The First International Biocurator Meeting

Funding Organization: Genetics Society of America (5133)

Dates of Project: 5/22/2005 – 12/01/2008

Award Amount: \$25,000

PI: Sue Rhee

Title: Enhancing the Quality and Quantity of *Arabidopsis* Metabolism Data in AraCyc and MetaCyc

Funding Organization: Pioneer Hi-Breed International (5119)

Dates of Project: 02/18/2005 – 08/06/2006

Award Amount: \$40,000

PI: Sue Rhee

Title: 2nd International Biocurator Meeting
Funding Organization: Villa Bosch (5134)
Dates of Project: 02/13/2007 – 02/12/2008
Award Amount: \$24,968
PI: Sue Rhee

Title: TAIR: The *Arabidopsis* Information Resource
Funding Organization: NSF: DBI-0417062 (2462)
Dates of Project: 09/01/2004 – 08/31/2009
Award Amount: \$7,988,952
PI: Sue Rhee

Title: *Arabidopsis* 2010: Metabolomics: A Functional Genomics Tool for Deciphering Functions of *Arabidopsis* Genes in the Context of Metabolic and Regulatory Networks
Funding Organization: Iowa State Univ. (NSF): 420-40-17 (4306)
Dates of Project: 09/01/2005 – 08/31/2008
Total Award Amount: \$1,000,000 **Individual Subaward Amount:** \$64,875
PI: Basil Nikolau

Title: Low Temperature Regulatory Circuits and Gene Regulation in Higher Plants
Funding Organization: MSU (NSF): DBI-0110124 (4433)
Dates of Project: 09/01/2001 – 08/31/2008
Total Award Amount: \$5,591,234 **Individual Subaward Amount:** \$539,021
PI: Michael F. Thomashow

Title: First International Biocurator Meeting
Funding Organization: NSF: DBI-0551286 (2282)
Dates of Project: 01/01/2006 – 12/31/2007
Award Amount: \$29,810
PI: Sue Rhee

Title: The Plant Ontology Consortium
Funding Organization: CSHL (NSF): 22130313 (4417)
Dates of Project: 09/01/2003 – 08/31/2007
Total Award Amount: \$1,672,411 **Individual Subaward Amount:** \$530,928
PI: Lincoln Stein

Title: The MetaCyc Metabolic Pathway Database
Funding Organization: SRI (NIH): 55-000650 (4441)
Dates of Project: 03/01/2004 – 02/28/2007
Total Award Amount: \$3,337,305 **Individual Subaward Amount:** \$839,512
PI: Peter Karp

Title: Gene Ontology Consortium
Funding Organization: The Jackson Laboratory (NIH): 2P41HG002273-04 (4442)
Dates of Project: 03/09/2004 – 02/28/2007
Total Award Amount: \$12,396,096 **Individual Subaward Amount:** \$634,431
PI: Judith Blake

Title: First International Biocurator Meeting
Funding Organization: NIH: 1R13HG004030-01 (1403)
Dates of Project: 12/07/2005 – 11/30/2006
Award Amount: \$12,000
PI: Sue Rhee

Title: The Arabidopsis Biological Resource Center at The Ohio State University
Funding Organization: OSURF (NSF): DBI-0091471 (4428)
Dates of Project: 02/01/2001 – 02/28/2006
Total Award Amount: \$2,123,500 **Individual Subaward Amount:** \$402,983
PI: Randy Scholl

Title: AtIR: An *Arabidopsis* Thaliana Information Resource
Funding Organization: NSF: DBI-9978564 (2665)
Dates of Project: 10/01/1999 – 09/30/2005
Award Amount: \$5,728,633
PI: Chris Somerville

Title: A Literature Curation Tool for Organism Databases
Funding Organization: NIH: 1R01HG02728-01 (1092)
Dates of Project: 09/30/2002 – 08/31/2005
Award Amount: \$896,386
PI: Sue Rhee

Title: Large-scale Fluorescent Tagging of Full-length Genes to Characterize Native Expression Patterns and Subcellular Targeting of *Arabidopsis* Proteins of Unknown Function
Funding Organization: SUNY at Stony Brook (NSF): 1027553 (4413)
Dates of Project: 09/01/2002 – 12/31/2004
Total Award Amount: \$1,580,000 **Individual Subaward Amount:** \$168,497
PI: Vitaly Citovsky

Title: Partnership for Research & Education in Plants
Funding Organization: Virginia Tech (NIH): CR-19501-431399 (4402)
Dates of Project: 09/30/2003 – 08/31/2004
Total Award Amount: \$249,302 **Individual Subaward Amount:** \$27,522
PI: Erin L. Dolan

Title: Gene Ontology Consortium
Funding Organization: The Jackson Laboratory (NIH) (4435)
Dates of Project: 01/01/2002 – 03/08/2004
Total Award Amount: \$5,784,994 **Individual Subaward Amount:** \$536,045
PI: Judith Blake

Title: Development of the MetaCyc Metabolic Pathway Database
Funding Organization: SRI (NIH): P11833 (4437)
Dates of Project: 03/01/2002 – 02/28/2004
Total Award Amount: \$1,842,466 **Individual Subaward Amount:** \$238,999
PI: Peter Karp

Title: Sequencing of *Arabidopsis* Chromosome II and Beyond, and Development of Resources for *Arabidopsis* Genome Analysis

Funding Organization: TIGR (NSF): TIGR-00-007 (4432)

Dates of Project: 05/01/2001 – 12/31/2001

Total Award Amount: \$15,806,875 **Individual Subaward Amount:** \$105,824

PI: Claire Fraser