

JBEI PUBLICATIONS - FY23

Core Publications

1. Scown C.D. (2022) "Prospects for carbon-negative biomanufacturing." Trends in Biotechnology. doi: 10.1016/j.tibtech.2022.09.004
2. Jardine K.J., Dewhirst R.A., Som S., Lei J., Tucker E., Young R.P., Portillo-Estrada M., Gao Y., Su L., Fares S., Castanha C., Scheller H.V., Mortimer J.C. (2022) "Cell wall ester modifications and volatile emission signatures of plant response to abiotic stress." Plant, Cell, and Env. doi: 10.1111/pce.14464
3. Østby H., Várnai A., Gabriel R., Chylenski P., Horn S.J., Singer S.W., Eijsink V.G.H.(2022) "Substrate-Dependent Cellulose Saccharification Efficiency and LPMO Activity of Cellic CTec2 and a Cellulolytic Secretome from *Thermoascus aurantiacus* and the Impact of H₂O₂-Producing Glucose Oxidase." ACS Sustainable Chem. Eng. doi: 10.1021/acssuschemeng.2c03341
4. Tom L.M., Aulitto M., Wu Y.-W., Gao Y.W., Deng K., Xiao N., Rodriguez B.G., Louime C., Northen T.R., Eudes A., Mortimer J., Adams P.D., Scheller H., Simmons B.A., Ceja-Navarro J., Singer S.W. (2022) "Low-abundance populations differentiate microbiome performance in plant cell wall deconstruction." Microbiome. Doi: 10.1186/s40168-022-01377-x
5. Walls L.E., Otoupal P., Ledesma-Amaro R., Velasquez-Orta S.B., Gladden J.M., Rios-Solis L. (2023) "Bioconversion of cellulose into bisabolene using *Ruminococcus flavefaciens* and *Rhodospiridium toruloides*." Bioresource Technology. doi: 10.1016/j.biortech.2022.128216
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7. Lin H.H., Mendez-Perez D., Park J., Wang X., Cheng Y., Huo J., Mukhopadhyay A., Lee T.S., Shanks B.H. (2022) "Precursor Prioritization for p-Cymene Production through Synergistic Integration of Biology and Chemistry." Biotechnology for Biofuels and Bioproducts. doi: 10.1186/s13068-022-02226-7
8. Tao X. B., LaFrance S., Xing Y., Nava A.A., Martin H.G., Keasling J.D., Backman T.W.H. (2022) "ClusterCAD 2.0: an updated computational platform for chimeric type I polyketide synthase and nonribosomal peptide synthetase design." Nucleic acids research. doi: 10.1093/nar/gkac1075
9. Otoupal P.B., Geiselman G.M., Oka A.M., Barcelos C.A., Choudhary H., Dinh D., Zhong W., Hwang H.J., Keasling J.D., Mukhopadhyay A., Sundstrom E., Haushalter R.W., Sun N., Simmons B.A., Gladden J.M. (2022) "Advanced one-pot deconstruction and valorization of lignocellulosic biomass into triacetic acid lactone using *Rhodospiridium toruloides*." Microbial Cell Factories. doi: 10.1186/s12934-022-01977-0
10. Park M.-R., Gauttam R., Fong B., Chen Y., Lim H.G., Feist A.M., Mukhopadhyay A., Petzold C.J., Simmons B.A., Singer S.W. (2022) "Revealing Oxidative Pentose Metabolism in New *Pseudomonas putida* Isolates." Environmental Microbiology. doi: 10.1111/1462-2920.16296
11. Lin C.Y., Geiselman G.M., Liu D., Magurudeniya H.D., Rodriguez A., Chen Y.C., Pidatala V., Unda F., Amer B., Baidoo E.E.K., Mansfield S.D., Simmons B.A., Singh S., Scheller H.V., Gladden J.M., Eudes A. (2022) "Evaluation of engineered low-lignin poplar for conversion

into advanced bioproducts." *Biotechnology for Biofuels and Bioproducts*. doi: 10.1186/s13068-022-02245-4

12. Huntington, T., Baral, N. R., Yang, M., Sundstrom, E., Scown, C. D. (2022) "Machine Learning for Surrogate Process Models of Bioproduction Pathways." *Bioresource Technology*. doi: 10.1016/j.biortech.2022.128528
13. Di X., Ortega-Alarcon D., Kakumanu R., Iglesias-Fernandez J., Diaz L., Baidoo E.E.K., Velazquez-Campoy A., Rodríguez-Concepción M., Perez-Gil J. (2022) "MEP pathway products allosterically promote monomerization of deoxy-D-xylulose-5-phosphate synthase to feedback regulate their supply." *Plant Communications*. doi: 10.1016/j.xplc.2022.100512
14. Valencia L.E., Incha M. R. Schmidt M., Pearson A.N., Thompson M.G., Roberts J.B., Mehling M., Yin K., Sun N., Oka A., Shih P.M., Blank L.M., Gladden J., Keasling J. D. (2022) "Engineering *Pseudomonas putida* KT2440 for chain length tailored free fatty acid and oleochemical production." *Communications Biology*. Doi: 10.1038/s42003-022-04336-2
15. Wang X., Baidoo E.E.K., Kakumanu R., Xie S., Mukhopadhyay A., Lee T. S. (2022) "Engineering isoprenoids production in metabolically versatile microbial host *Pseudomonas putida*." *Biotechnology for biofuels and bioproducts*. doi: 10.1186/s13068-022-02235-6
16. Banerjee D., Mukhopadhyay A. (2023) "Perspectives in growth production trade-off in microbial bioproduction." *RSC Sustainability*. doi: 10.1039/D2SU00066K
17. Mohan M., Simmons B.A., Sale K.L., Singh S. (2023) "Multiscale molecular simulations for the solvation of lignin in ionic liquids." *Sci Rep*. doi: 10.1038/s41598-022-25372-2
18. Gauttam R., Eng T., Zhao Z., ul ain Rana Q., Simmons B.A., Yoshikuni Y., Mukhopadhyay A., Singer S.W. (2023) "Development of genetic tools for heterologous protein expression in a pentose-utilizing environmental isolate of *Pseudomonas putida*." *Microbial Biotechnology*. doi: 10.1111/1751-7915.14205
19. de Raad M., Koper K., Deng K., Bowen B. P., Maeda H. A., Northen T. R. (2023) "Mass spectrometry imaging-based assays for aminotransferase activity reveal a broad substrate spectrum for a previously uncharacterized enzyme." *The Journal of Biological Chemistry*. doi: 10.1016/j.jbc.2023.102939
20. Martin H.G., Radivojevic R., Zucker J., Bouchard K., Sustarich J., Peisert S., Arnold D., Hillson N., Babnigg G., Marti J.M., Mungall C.J., Beckham G.T. Waldburger L, Carothers J., Sundaram S., Agarwal D., Simmons B.A., Backman T., Banerjee D., Tanjore E., Ramakrishnan L., Singh A. (2023) "Perspectives for self-driving labs in synthetic biology." *Current Opinion in Biotechnology*. doi: 10.1016/j.copbio.2022.102881
21. Choi J., Rodriguez A., Simmons B.A., Gladden J.M. (2023) "Valorization of Hemp-Based Packaging Waste with One-Pot Ionic Liquid Technology." *Molecules*. doi: 10.3390/molecules28031427
22. Papa G., Simmons B.A., Sun N. (2022) "Scale-Up of the Ionic Liquid-Based Biomass Conversion Processes." In: Zhang, S. (eds) *Encyclopedia of Ionic Liquids*. Springer, Singapore. doi: 10.1007/978-981-33-4221-7_49
23. Mohan M., Demerdash O., Simmons B.A., Smith J.C., Kidder M.K., Singh S. (2023) "Accurate Prediction of Carbon Dioxide Capture by Deep Eutectic Solvents using Quantum Chemistry and a Neural Network." *Green Chemistry*. doi: 10.1039/D2GC04425K
24. Prabhakar P. K., Pereira J. H., Taujale R., Shao W., Bharadwaj V. S., Chapla D., Yang J. Y., Bomble Y. J., Moremen K. W., Kannan N., Hammel M., Adams P. D., Scheller H. V.,

- Urbanowicz B. R. (2023) "Structural and biochemical insight into a modular β -1,4-galactan synthase in plants." *Nature plants*. doi: 10.1038/s41477-023-01358-4
25. Wang Y., Baral N. R., Yang M., Scown C. D. (2023) "Co-Processing Agricultural Residues and Wet Organic Waste Can Produce Lower-Cost Carbon-Negative Fuels and Bioplastics." *Environmental science & technology*. doi: 10.1021/acs.est.2c06674
26. Sirirungruang S., Barnum C. R., Tang S. N., Shih P. M. (2023) "Plant glycosyltransferases for expanding bioactive glycoside diversity." *Natural product reports*. doi: 10.1039/d2np00077f
27. Choudhary H., Das L., Pelton J. G., Sheps L., Simmons B. A., Gladden J., Singh S. (2023) "Funneled Depolymerization of Ionic Liquid-Based Biorefinery 'Heterogeneous' Lignin into Guaiacols over Reusable Palladium Catalyst." *Chemistry*. doi: 10.1002/chem.202300330
28. Zha J., Zhao Z., Xiao Z., Eng T., Mukhopadhyay A., Koffas M.A.G., Tang Y.J. (2023) "Biosystem design of *Corynebacterium glutamicum* for bioproduction." *Curr Opin Biotechnol*. doi: 10.1016/j.copbio.2022.102870
29. Lankiewicz T. S., Choudhary H., Gao Y., Amer B., Lillington S.P., Leggieri P.A., Brown J.L., Swift C.L., Lipzen A., Na H., Amirebrahimi M., Theodorou M. K., Baidoo E.E.K., Barry K., Grigoriev I.V., Tomhokin V.I., Gladden J., Singh S., Mortimer J.C., Ralph J., Simmons B.A., Singer S.W., O'Malley M.A. (2023) "Lignin deconstruction by anaerobic fungi." *Nature Microbiology*. doi: 10.1038/s41564-023-01336-8
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31. Hirakawa M.P., Rodriguez A., Tran-Gyamfi M.B., Light Y.K., Martinez S., Diamond-Pott H., Simmons B.A., Sale K.L. (2023) "Phenothiazines Rapidly Induce Laccase Expression and Lignin-Degrading Properties in the White-Rot Fungus *Phlebia radiata*." *Journal of Fungi*. doi: 10.3390/jof9030371
32. Yin K., Cruz-Morales P., Whitford C.M., Keasling J.D. (2023) "Heterologous production of polycyclopropanated fatty acids and their methyl esters in *Streptomyces*." *STAR Protocols*. doi: 10.1016/j.xpro.2023.102190
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34. Englund E., Schmidt M., Nava A.A., Lechner A., Deng K., Jovic R., Lin Y., Roberts J., Benites V.T., Kakumanu R., Gin J.W., Chen Y., Liu Y., Petzold C.J., Baidoo E.E.K., Northen T.R., Adams P.D., Katz L., Yuzawa S., Keasling J.D. (2023) "Expanding Extender Substrate Selection for Unnatural Polyketide Biosynthesis by Acyltransferase Domain Exchange within a Modular Polyketide Synthase." *Journal of the American Chemical Society*. doi: 10.1021/jacs.2c11027
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36. Zhou A., Kirkpatrick L.D., Ornelas I.J., Washington L.J., Hummel N.F.C., Gee C.W., Tang S.N., Barnum C.R., Scheller H.V., Shih P.M. (2023) "A Suite of Constitutive Promoters for Tuning Gene Expression in Plants." *ACS Synth Biol*. doi: 10.1021/acssynbio.3c00075

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38. Eudes A., Lin C.Y., De Ben C., Ortega J., Lee M.Y., Chen Y.C., Li G., Putnam D.H., Mortimer J.C., Ronald P.C., Scown C.D., Scheller H.V. (2023) "Field Performance of Switchgrass Plants Engineered for Reduced Recalcitrance." *Front Plant Sci.* doi: 10.3389/fpls.2023.1181035
39. Pearson A.N., Thompson M.G., Kirkpatrick L.D., Ho C., Vuu K.M., Waldburger L.M., Keasling J.D., Shih P.M. (2023) "The pGinger Family of Expression Plasmids." *Microbiology Spectrum.* doi: 10.1128/spectrum.00373-23
40. Huang J., Quest A., Cruz-Morales P., Deng K., Pereira J.H., Van Cura D., Kakumanu R., Baidoo E.E.K., Dan Q., Chen Y., Petzold C.J., Northen T.R., Adams P.D., Clark D.S., Balskus E.P., Hartwig J.F., Mukhopadhyay A., Keasling J.D. (2023) "Complete integration of carbene-transfer chemistry into biosynthesis." *Nature.* doi: 10.1038/s41586-023-06027-2
41. Hubble D., Nordahl S., Zhu T., Baral N., Scown C.D., Liu G. (2023) "Solvent-Assisted Poly(lactic acid) Upcycling under Mild Conditions." *ACS Sustainable Chemistry & Engineering* doi: 10.1021/acssuschemeng.2c06500
42. Liu D., Hwang H.J., Otoupal P.B., Geiselman G.M., Kim J., Pomraning K.R., Kim Y.M., Munoz N., Nicora C.D., Gao Y., Burnum-Johnson K.E., Jacobson O., Coradetti S., Kim J., Deng S., Dai Z., Prahl J.P., Tanjore D., Lee T.S., Magnuson J.K., Gladden J.M. (2023) "Engineering *Rhodospiridium toruloides* for production of 3-Hydroxypropionic acid from lignocellulosic Hydrolysate." *Metabolic Engineering.* doi: 10.1016/j.ymben.2023.05.001
43. Van Cura D., Ng T. L., Huang J., Hager H., Hartwig J. F., Keasling J. D., Balskus E. P. (2023) "Discovery of the Azaserine Biosynthetic Pathway Uncovers a Biological Route for α -Diazoester Production." *Angewandte Chemie.* doi: 10.1002/anie.202304646
44. Sha G., Sun P., Kong X., Han X., Sun Q., Fouillen L., Zhao J., Li Y., Yang L., Wang Y., Gong Q., Zhou Y., Zhou W., Jain R., Gao J., Huang R., Chen X., Zheng L., Zhang w., Qin Z., Zhou Q., Zeng Q., Xie K., Xu J., Chiu T.Y., Guo L., Mortimer J.C., Boutté Y., Li Q., Kang Z., Ronald P.C., Li G. (2023) "Genome editing of a rice CDP-DAG synthase confers multi-pathogen resistance." *Nature Magazine.* doi: 10.1038/s41586-023-06205-2
45. Sword T.T., Barker J.W., Spradley M., Chen Y., Petzold C.J., Bailey C.B. (2023) "Expression of blue pigment synthetase a from *Streptomyces lavendulae* reveals insights on the effects of refactoring biosynthetic megasynthases for heterologous expression in *Escherichia coli*." *Protein Expr Purif.* doi: 10.1016/j.pep.2023.106317
46. Hummel N.F.C., Zhou A., Li B., Markel K., Ornelas I.J., Shih P.M. (2023) "The trans-regulatory landscape of gene networks in plants." *Cell Syst.* doi: 10.1016/j.cels.2023.05.002
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53. Zhan, C., Lee, N., Lan, G., Dan Q., Cowan A., Wang Z., Baidoo E.E.K., Kakumanu R., Luckie B., Kuo R.C., McCauley J., Liu Y., Valencia L., Haushalter R.W., Keasling J.D. (2023) "Improved polyketide production in *C. glutamicum* by preventing propionate-induced growth inhibition." *Nat Metab*. Doi: 10.1038/s42255-023-00830-x
54. Seppälä S., Gierke T., Schauer E.E., Brown J.L., O'Malley M.A. (2023) "Identification and expression of small multidrug resistance (SMR) transporters in early-branching anaerobic fungi." *Protein Sci*. doi: 10.1002/pro.4730
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59. Garcia V.E., Pidatala V., Barcelos C.A., Liu D., Otoupal P., Wendt O., Choudhary H., Sun N., Eudes A., Sundstrom E.R., Scheller H.V., Putnam D.H., Mukhopadhyay A., Gladden J.M., Simmons B.A., Rodriguez A. (2023) "Enhanced microbial production of protocatechuate from engineered sorghum using an integrated feedstock-to-product conversion technology." *Green Chemistry*. doi: 10.1039/D3GC01481A

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Enabled Publications

1. Li L., Zhang R., Chen L., Tian X., Li T., Pu B., Ma C., Ji X., Ba F., Xiong C., Shi Y., Mi X., Li J., Keasling J.D., Zhang J., Liu Y. (2022) "Permeability-Engineered Compartmentalization Enables In Vitro Reconstitution of Sustained Synthetic Biology Systems." *Adv Sci (Weinh)*. doi: 10.1002/advs.202203652
2. Wilhelm R.C., Barnett S.E., Swenson T.L., Youngblut N.D., Koechli C.N., Bowen B.P., Northen T.R., Buckley D.H. (2022) "Tracing Carbon Metabolism with Stable Isotope Metabolomics Reveals the Legacy of Diverse Carbon Sources in Soil." *Appl Environ Microbiol*. doi: 10.1128/aem.00839-22
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8. Serrano K., Bezrutczyk M. (2023) "Genome to gut: crop engineering for human microbiomes." *Nat Rev Microbiol*. doi: [10.1038/s41579-022-00850-6](https://doi.org/10.1038/s41579-022-00850-6)

9. Zhao R., Sengupta A., Tan A.X., Whelan R., Pinkerton T., Menasalvas J., Eng T., Mukhopadhyay A., Jun Y.-S., Pakrasi H.B., Tang Y. (2022) "Photobiological production of high-value pigments via compartmentalized co-cultures using Ca-alginate hydrogels npg." *Sci Rep* doi: [10.1038/s41598-022-26437-y](https://doi.org/10.1038/s41598-022-26437-y)
10. Dai J., Wilhelm K. B., Bischoff A. J., Pereira J. H., Dedeo M. T., García-Almedina D. M., Adams P. D., Groves J. T., Francis M. B. (2023) "A Membrane-Associated Light-Harvesting Model is Enabled by Functionalized Assemblies of Gene-Doubled TMV Proteins." *Small*. doi: [10.1002/sml.202207805](https://doi.org/10.1002/sml.202207805)
11. Qin Z., Guan K., Zhou W., Peng B., Tang J., Jin Z., Grant R., Hu T., Villamil M.B., DeLucia E., Margenot A.J., Mishra U., Chen Z., Coppess J. (2023) "Assessing long-term impacts of cover crops on soil organic carbon in the central U.S. Midwestern agroecosystems." *Global Change Biology*. doi: [10.1111/gcb.16632](https://doi.org/10.1111/gcb.16632)
12. Sanders L.M., Scott R.T., Yang J.H., Qutub A.A., Garcia Martin H., Berrios D.C., Hastings J.J.A., Rask J., Mackintosh G., Hoarfrost A.L., Chalk S., Kalantari J., Khezeli K., Antonsen E.L., Babdor J., Barker R., Baranzini S.E., Beheshti A., Delgado-Aparicio G.M., Glicksberg B.S., Greene C.S., Haendel M., Hamid A.A., Heller P., Jamieson D., Jarvis K.J., Komarova S.V., Komorowski M., Kothiyal P., Mahabal A., Manor U., Mason C.E., Matar M., Mias G.I., Miller J., Myers J.G., Nelson C., Oribello J., Park S.M., Parsons-Wingenter P., Prabhu R.K., Reynolds R.J., Saravia-Butler A., Saria S, Sawyer A., Singh N.K., Snyder M., Soboczinski F., Soman K., Theriot C.A., Van Valen D., Venkateswaran K., Warren L., Worthey L., Zitnik M., Costes S.V. (2023) "Biological research and self-driving labs in deep space supported by artificial intelligence." *Nature Machine Intelligence*. doi: [10.1038/s42256-023-00618-4](https://doi.org/10.1038/s42256-023-00618-4)
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