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RESEARCH INTERESTS

Plant molecular physiologist experienced in biochemistry, specifically the application of mass spectrometry to research problems in genomics, bioenergy crop production, environmental stress physiology, and plant-microbe signaling. Current research includes metabolomics for phenotypic characterization of genetically modified *Populus, Arabidopsis*, *Eucalyptus*, *Castanea*, switchgrass, and numerous bioenergy-relevant microbial species. Research targets include the application of genomic tools for the accelerated domestication of *Populus* to increase drought tolerance and biomass productivity on marginal sites, and to manipulate bioproduct formation. Most recent activities include characterizing the molecular basis of plant-microbe (bacterial and fungal) symbiotic relationships in contrast with pathogenic relationships.

POSITIONS

2019-present	**Section Head Biodesign & Systems Biology, Distinguished R&D Staff** Biosciences Division, Oak Ridge National Laboratory, Oak Ridge, TN
2007-2019	**Group Leader Metabolomics**, **Distinguished R&D Staff** Biosciences Division, Oak Ridge National Laboratory, Oak Ridge, TN
2004-present	**Joint Faculty ORNL Graduate Adviso**r for the Bredesen Center for Interdisciplinary Research and Graduate Education, and the UT-ORNL Genome Science & Technology Graduate School, University of Tennessee, Knoxville
2002-2006	**Senior Scientist**, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN
1995-1997	**Adjunct Professor**, Institute of Agriculture, Univ. of Tennessee, Knoxville, TN
1990-2002	**Research Staff**, Environmental Sciences Division, ORNL, Oak Ridge, TN
1989-1990	**ASG Postdoctoral Research Associate**, Environmental Sciences Division Oak Ridge National Laboratory, Oak Ridge, TN
1987-1989	**ORAU Postdoctoral Research Associate**, Environmental Sciences Division Oak Ridge National Laboratory, Oak Ridge, TN
1986	**Lecturer**, Tree Physiology, University of Toronto, Toronto, Canada

EDUCATION

1982-87	**Ph.D. Forestry** - University of Toronto, Toronto, Ontario, Canada
1980-82	**M.Sc. Forestry** - University of Toronto, Toronto, Ontario, Canada
1976-80	**B.Sc. Biology** - Carleton University, Ottawa, Ontario, Canada

PUBLICATIONS - 202 total

Yuan, G., H. Lu, T.J. Tschaplinski, G.A. Tuskan, X. Yang. 2022. Reporter genes confer new-to-nature ornamental traits in plants. Hort. Res. (accepted)

Bewg, W., S. Harding, N. Engle, B. Vaidya, R. Zhou, J. Reeves, T. Horn, N. Joshee, J. Jenkins, S. Shu, K. Barry, Y. Yoshinaga, J. Grimwood, R. Schmitz, J. Schmutz, T.J. Tschaplinski, and C.-J. Tsai. 2022. Multiplex knockout of trichome-regulating MYB duplicates in hybrid poplar using a single gRNA. Plant Phys. (accepted)

Hu, X.-L., J. Zhang, R. Kaundal, R. Kataria, J.L. Labbe, J.C. Mitchell, T.J. Tschaplinski, G.A. Tuskan, and Z.-M. Cheng, and X. Yang. 2022. Diversity and conservation of plant small secreted proteins associated with arbuscular mycorrhizal symbiosis. Hort. Res. (in press) https://doi.org/10.1093/hr/uhac043

Zhuo, C., X. Wang, M. Docampo-Palacios, B.C. Sanders, N.L. Engle, T.J. Tschaplinski, J.H. Rajeswaran, C. Maranas, F. Chen, and R.A. Dixon. 2022. Developmental changes in lignin composition are driven by both monolignol supply and laccase specificity. Sci. Adv. 8, eabm8145 https://doi.org/10.1126/sciadv.abm8145

Liew, F., R. Nogle, T. Abdalla, B.J. Rasor, C. Canter, R.O. Jensen, L. Wang, J. Strutz, P. Chirania, S. De Tissera, A.P. Mueller, Z. Ruan, A. Gao, L. Tran, J.C. Bromley, J. Daniell, R. Conrado, N.L. Engle, T.J. Tschaplinski, R.J. Giannone, R.L. Hettich, A.S. Karim, S.D. Simpson, S.D. Brown, C. Leang, M.C. Jewett, and M. Köepke. 2022. Carbon-negative production of acetone and isopropanol by gas fermentation at industrial pilot scale. Nature Biotech. 40:335-344. https://doi.org/10.1038/s41587-021-01195-w

Villalobos Solis, M.I., N.L. Engle, M.K. Spangler, S. Cottaz, S. Fort, J. Maeda, J.-M. Ané, T.J. Tschaplinski, J. L. Labbé, R. L. Hettich, P.E. Abraham, and T.A. Rush. 2022. Expanding the biological role of lipo-chitooligosaccharides and chitooligosaccharides in *Laccaria bicolor* growth and development. Front. Fungal Biol. 3:808578. https://doi.org/10.3389/ffunb.2022.808578

Sacko, O., N.L. Engle, T.J. Tschaplinski, S. Kumar, and J. Lee. 2022. Ozonized biochar filtrate effects on the growth of *Pseudomonas putida* and cyanobacteria *Synechococcus elongatus* PCC 7942. Bioresour. Bioprocess. 9, 2 (2022). https://doi.org/10.1186/s40643-021-00491-2

Bonito, G., M.-Y. Chou, M.A. Cregger, J.L. Field, H.G. Martin, A.C. Howe, J.L. Labbe, M.E. Mechan-Llontop, T.R. Northen, A. Shade, and T.J. Tschaplinski. 2021. Frontiers and opportunities in bioenergy crop microbiome research networks. Phytobiomes J (5 Oct., 2021 First look) https://doi.org/10.1094/PBIOMES-05-21-0033-MR

Yang, X., D. Liu, H. Lu, D.J. Weston, J.-G. Chen, W. Muchero, S. Martin, Y. Liu, M.M. Hassan, G. Yuan, U.C. Kalluri, T.J. Tschaplinski, J.C. Mitchell, S.D. Wullschleger, and G.A. Tuskan. 2021. Biological parts for plant biodesign to enhance land-based carbon dioxide removal. BioDesign Res, vol. 2021, Article ID 9798714, 22 pages, 2021. https://doi.org/10.34133/2021/9798714

Devireddy, A.R., T.J. Tschaplinski, G.A. Tuskan, W. Muchero, and J.-G. Chen. 2021. Role of reactive oxygen species and hormones in plant responses to temperature changes. Int J Mol Sci 2021, 22: 8843. https://doi.org/10.3390/ijms22168843

Yao, T., K. Feng, M. Xie, J. Barros, T.J. Tschaplinski, G.A. Tuskan, W. Muchero, J.-G. Chen. 2021. Phylogenetic occurrence of the phenylpropanoid pathway and lignin biosynthesis in plants. Front. Plant Sci., 17 August 2021, 12:1673 https://doi.org/10.3389/fpls.2021.704697

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Hu, X.-L., H. Lu, M.M. Hassan, J. Zhang, G. Yuan, P.E. Abraham, H.K. Shrestha, M.I.V. Solis, J.-G. Chen, T.J. Tschaplinski, M.J. Doktycz, G.A. Tuskan, Z.-M. Cheng, and X. Yang. 2021. Advances and perspectives in discovery and functional analysis of small secreted proteins in plants. Hort. Res. 8:130 https://doi.org/10.1038/s41438-021-00570-7

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Jiang, S.C., N.L. Engle, Z.Z. Banday, N.M. Cecchini, H.W. Jung, T.J. Tschaplinski, and J.T. Greenberg. 2020. ALD1 accumulation in Arabidopsis epidermal plastids confers local and nonautonomous disease resistance. J. Exp. Bot. 72:2710-2726. https://doi.org/10.1093/jxb/eraa609

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Veach, A.M., H. Chen, Z.K. Yang, A. Labbe, N.L. Engle, T.J. Tschaplinski, C.W. Schadt, and M.A. Cregger. 2020. Plant hosts modify belowground microbial community response to extreme drought. mSystems https://doi.org/10.1128/mSystems.00092-20

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Yang, X., D. Liu, T.J. Tschaplinski, and G.A. Tuskan. 2019. Comparative genomics can provide new insights into evolutionary mechanisms and gene function in CAM plants. J. Exp. Bot. 70(22):6539-6547. https://doi.org/10.1093/jxb/erz408

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Xie, M. J. Zhang, V.R. Singan, M.J. Mcgranahan, P.R. LaFayette, S.S. Jawdy, N. Engle, C. Doeppke, T.J. Tschaplinski, M.F. Davis, E. Lindquist, J. Schmutz, W. Parrott, G.A. Tuskan, J.-G. Chen, and W. Muchero. 2020. Identification of functional single nucleotide polymorphism of *Populus trichocarpa* PtrEPSP-TF and determination of its transcriptional effect. Plant Direct 4:1-13. https://doi.org/10.1002/pld3.178

Zhang, J., M. Xie, M. Li, J. Ding, Y. Pu, A. Bryan, W. Rottmann, K. Winkeler, C. Collins, Cassandra, V. Singan, E. Lindquist, S. Jawdy, L. Gunter, N. Engle, X. Yang, K. Barry, T.J. Tschaplinski, J. Schmutz, G. Tuskan, W. Muchero, and J.-G. Chen. 2019. Overexpression of a Prefoldin β subunit gene reduces biomass recalcitrance in the bioenergy crop *Populus*. Plant Biotechnol. J. https://doi.org/10.1111/pbi.13254 pp. 1-13

Close, D.M., S.J. Cooper, X. Wang, P. Chirania, M. Gupta, J.R. Ossyra, R.J. Giannone, N. Engle, T.J. Tschaplinski, J.C. Smith, L. Hedstrom, J.M. Parks, and J.K. Michener. 2019. Horizontal transfer of a pathway for coumarate catabolism unexpectedly inhibits purine nucleotide biosynthesis. Molecular Microbiol. 112:1784–1797 https://doi.org/10.1111/mmi.14393

Yang, H., C.-G. Yoo, X. Meng, Y. Pu, W. Muchero, G.A. Tuskan, T.J. Tschaplinski, A.J. Ragauskas, and L. Yao. 2020. Structural changes of lignins in natural *Populus* variants during different pretreatments. Bioresource Tech. 295: 122240 https://doi.org/10.1016/j.biortech.2019.122240

Yao, I., C.G. Yoo, X. Meng, Y. Pu, W. Muchero, G.A. Tuskan, T.J. Tschaplinski, A.J. Ragauskas, and H. Yang. 2019. Physicochemical changes of cellulose and their influences on *Populus trichocarpa* digestibility after different pretreatments. BioResources 14:9658-9676. https://doi.org/10.15376/biores.14.4.9658-9676

Furches, A., D. Kainer, D. Weighill, A. Large, P. Jones, A.M. Walker, J. Romero, J.G.F.M. Gazolla, W. Joubert, M. Shah, J. Streich, P. Ranjan, J. Schmutz, A. Sreedasyam, D. Macaya-Sanz, N. Zhao, M.Z. Martin, X. Rao, R.A. Dixon, S. DiFazio, T.J. Tschaplinski, J.-G. Chen, G.A. Tuskan, and D. Jacobson. 2019. Finding new cell wall regulatory genes in *Populus trichocarpa* using multiple lines of evidence. Front. Plant Sci. 10: Article 1249, 08 October 2019 https://doi.org/10.3389/fpls.2019.01249

Weighill, D.A, T.J. Tschaplinski, G.A. Tuskan, and D.A. Jacobson. 2019. Data integration in poplar: ‘omics layers and integration strategies. Front. Genet. 10:874. https://doi.org/10.3389/fgene.2019.00874

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Blake, T.J., T.J. Tschaplinski, and A. Eastham. 1984. Stomatal control of water use efficiency in poplar clones and hybrids. Can. J. Bot. 62:1344-1351.

THESES

Ph.D.	Physiological correlatives of vigorous growth in hybrid poplar.
M.Sc.F.	The effects of root restriction on growth, water relations and senescence of European alder (*Alnus glutinosa* Gaertn.) seedlings.
B.Sc.	The age composition of a collection of rabid and non-rabid Big Brown Bats (*Eptesicus fuscus*) as determined by dental annuli.

PROFESSIONAL SOCIETIES/ACTIVITIES

Review Editor on the Editorial Board of Omics (specialty section of Frontiers in Analytical Science) (2021-present)
Current Metabolomics and Systems Biology - Editorial Board (2012 – present) – Requested but declined invitation to be the Editor-in-Chief (Dec. 2019)
Environmental and Experimental Botany – Editorial Board (2002 – present)
Tree Physiology – Editorial Review Board (intermittent from 1994 – present)
Plants: Plant Genetics and Genomics Section – Editorial Board (2020)
Scientific Reports (a Nature journal) Editorial Board (2019)
DOE-ARPA-E Phytosequestration Workshop (2015)
DOE-ARPA-E- Transportation Energy Resources from Renewable Agriculture (TERRA) – Workshop participant and Review Panel Member (2014)
ORNL Invention Disclosure Review Committee – (2008 – 2011)
DOE Genomic Science and Technology for Energy and the Environment Review – Microbial and Plant Processes for Bioenergy Reviewer (2010)
DOE-EREE High-Yield Scenario Workshop – Woody Energy Crops Participant (2009)
DOE 30x30 Workshop on Biomass Energy – Woody Crop Development panel member (2006)
Southeast Regional Biomass Consortium – Lead of Woody Crop Development (2006)
International Poplar Genome Consortium – Coordinator of the Metabolic Characterization and Metabolomics section of the Science Plan for post-genome sequencing research (2002)
Bioactive Natural Products Consortium – University of Tennessee – member (2002 – 2004)
National Science Foundation – Major Research Instruments Panel (1998)
US DOE rep. to the International Energy Agency Ecophysiology Working Group (1989-1993)
International Society for Molecular Plant-Microbe Interactions – member/participant
American Society of Plant Biologists – member/participant
Canadian Society of Plant Physiologists – member/participant

SCHOLARSHIPS

1985	Canadian Forestry Service Scholar Scholarship
1984	Natural Sciences & Engineering Research Council Postgraduate Scholarship – Forestry Special
1983	Natural Sciences and Engineering Research Council Postgraduate Scholarship
1982	Natural Sciences and Engineering Research Council Postgraduate Scholarship

1982	Edward Elsworth Johnson Postgraduate Forestry Fellowship
1981	University of Toronto Open Master's Fellowship
1980	Canadian National Sportsmen's Fellowship
1980	Natural Sciences and Engineering Research Council - Summer Research Award