

## TIMOTHY J. TSCHAPLINSKI

Section Head, Biodesign & Systems Biology  
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**Google Scholar H-Index: 72**

## 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 Advisor** 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** – 233 total (including 11 patents)

Groover, A., M. Holbrook, A. Polle, A. Sala, B. Medlyn, C. Brodersen, J. Pittermann, J. Gersony, K. Sokołowska, L. Bogar, N. McDowell, R. Spicer, R. David-Schwartz, S. Keller, T. Tschaplinski, and Y. Preisler. 2024. Tree drought physiology: Critical research questions and strategies for mitigating climate change effects on forests. *New Phytol.* (tentatively accepted)

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Elliott, M.K., R.A. Thompson, R.J. Giannone, L.W. Mendelson, D.L. Carper, M.Z. Martin, M.E. Martin, N.L. Engle, T.J. Tschaplinski, S.D. Brown, and R.L. Hettich. 2024. *Clostridium autoethanogenum* alters cofactor synthesis, redox, and lysine-acetylation in response to increasing H<sub>2</sub>:CO feedstock ratios for enhancing carbon capture efficiency. *Biotech for Biofuels and Bioprod.* 17:119. <https://doi.org/10.1186/s13068-024-02554-w>

Simon, S., A. Furches, H. Chhetri, L. Evans, P. Jones, G. Wimp, D. Macaya-Sanz, D. Jacobson, T. Tschaplinski, G. Tuskan, S.P. DiFazio. 2024. Genetic underpinnings of arthropod community distributions in *Populus trichocarpa*. *New Phyt.* 242:1307-1323. <https://doi.org/10.1111/nph.19660>

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de Freitas Pereira, M., D. Cohen, L. Auer, N. Aubry, M.-B. Bogeat-Triboulot, C. Bure, N. L. Engle, Y. Jolivet, A. Kohler, O. Novák, I. Pavlovic, P. Priault, T. J. Tschaplinski, I. Hummel, M.-N. Vaultier, and C. Veneault-Fourrey. 2023. Ectomycorrhizal symbiosis prepares its host locally and systemically for abiotic cue signaling. *The Plant Journal* 116:1784-1803. <http://doi.org/10.1111/tpj.16465>

Bryant, N., N. Engle, T. Tschaplinski, Y. Pu, and A.J. Ragauskas. 2023. Variable lignin structure revealed in *Populus* leaves. *RSC Advances* 13:20187-20197 <https://doi.org/10.1039/D3RA03142J>

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key hub gene in adventitious root development in *Populus*. *New Phytol.* 239:2248-2264.  
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<https://doi.org/10.3389/fpls.2023.1210146>

Bryant, N., W. Muchero, R. Weber, J. Barros, J.-G. Chen, T.J. Tschaplinski, Y. Pu, and A.J. Ragauskas. 2023. Cell wall response of field grown *Populus* to *Septoria* infection. *Sec. Plant Pathogen Interactions.* *Front. Plant Sci.* 14:1089011.  
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Him K. Shrestha, H.K., R.A. Dixon, N.L. Engle, T.J. Tschaplinski, R.L. Hettich, J. Barros, and P.E. Abraham. 2022. Multi-omic characterization of bifunctional peroxidase 4-coumarate 3-

hydroxylase knockdown in *Brachypodium distachyon* provides insights into lignin modification-associated pleiotropic effects. *Front. Plant Sci.* 13:908649.

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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.* 189: 516–526 <https://doi.org/10.1093/plphys/kiac128>

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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>

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Qiao, Z., T.B. Yates, H.K. Shrestha, N.L. Engle, A. Flanagan, J.L. Morrell-Falvey, Y. Sun, T.J. Tschaplinski, P.E. Abraham, J. Labbé, Z.-Y. Wang, R.L. Hettich, G.A. Tuskan, W. Muchero, and J.-G. Chen. 2021. Towards engineering ectomycorrhization into switchgrass bioenergy crops via a lectin receptor-like kinase. *Plant Biotechnol. J.* 9(12):2454-2468 <https://doi.org/10.1111/pbi.13671>

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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### **PATENTS** - 11 total

CA-2696438-C	The use of azelaic acid for priming a plant to induce a resistance response against a pathogen
US-2014182013-A1	Key gene regulating cell wall biosynthesis and recalcitrance in <i>Populus</i> , gene Y
US-2020102571-A1	Methods for controlling cell wall biosynthesis and genetically modified plants
US-10144938-B2	Methods of processing aromatic compounds
WO-2013093637-A2	Plant treatment methods and means therefore
AU-2014246584-B2	Plant pathogen resistance
US-2020325505-A1	Filamentous fungi capable of producing very long chain fatty acids
US-2021261993-A1	Microorganisms and methods for producing 2-pyrone-4,6-dicarboxylic acid and other compounds
US-2020399637-A1	Loss of function alleles of PtEPSP-TF and its regulatory targets in rice
US-11028404-B2	Methods of improving mycorrhization in plants and genetically modified plants with improved mycorrhization
US-2019136251-A1	Gene impacting cellulose content and biomass formation and methods of use

### **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 ( <i>Alnus glutinosa</i> Gaertn.) seedlings.
B.Sc.	The age composition of a collection of rabid and non-rabid Big Brown Bats ( <i>Eptesicus fuscus</i> ) as determined by dental annuli.

### **PROFESSIONAL SOCIETIES/ACTIVITIES**

DOE Resilient Bioenergy Crop Production Workshop – Participant (2024)  
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 – 2023)  
Current Metabolomics and Systems Biology - Editorial Board (2012 - 2022)

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