

XIAOHAN YANG

Biosciences Division
Oak Ridge National Laboratory
1 Bethel Valley Road
Building 1505, Room 248
Oak Ridge, TN 37831-6407 USA

Phone: 865-241-6895
E-mail: yangx@ornl.gov
orcid.org/0000-0001-5207-4210
<https://www.ornl.gov/staff-profile/xiaohan-yang>
<https://scholar.google.com/citations?user=DYH7aqAAAAAJ&hl=en>

Education and Training

2006 – 2008 Oak Ridge National Laboratory (ORNL), Postdoc in *Populus* genomics
2005 – 2006 University of Tennessee, Postdoc in *Populus* genomics
2002 – 2005 Cornell University, Postdoc in molecular genetics of Arabidopsis
2003 Cornell University, Ph.D. Floriculture & Ornamental Horticulture/Plant Molecular Biology/Plant Breeding
1989 Huazhong Agricultural University, China M.S., Ornamental Botany
1986 Huazhong Agricultural University, China B.Sc., Forest Science

Research and Professional Experience

2023 – present Distinguished Scientist, Biosciences Division, Oak Ridge National Laboratory
2017 – 2023 Senior Staff Scientist, Biosciences Division, Oak Ridge National Laboratory
2015 – present Faculty Member, Bredesen Center for Interdisciplinary Research and Graduate Education, University of Tennessee, Knoxville
2014 – present Joint Faculty, Graduate School of Genome Science and Technology (GST), University of Tennessee, Knoxville
2011 – 2016 Staff Scientist, Biosciences Division, Oak Ridge National Laboratory
2009 – 2017 Adjunct Faculty, Department of Plant Sciences, University of Tennessee, Knoxville
2008 – 2011 Associate Staff Scientist, Biosciences Division, Oak Ridge National Laboratory
1989 – 1997 Assistant Research Scientist, Chinese Academy of Agricultural Sciences, Beijing, China.

Honors and Awards

2022 The first prize of Cells 2021 Best Paper Awards for Anniversary Special Issues (<https://www.mdpi.com/journal/cells/awards/1113>)
2018 The R&D 100 Award
2008 Distinguished Achievement Award for Post-Graduate Research in Environmental Science (In recognition of outstanding early career productivity, ability to collaborate effectively in a team setting, and ability to integrate bioinformatics and molecular biology to gain novel insights into evolutionary genomics).
2000 Liu Memorial Award in recognition of his excellent progress and high potential for a successful academic career.
1995 Israeli Foreign Ministry Fellowship for training at the Volcani Center.

Other Professional Activities

Expert panel

- Research Foundation – Flanders (FWO), a Belgian public research council, based in Brussels (January 1, 2021 - present).

Proposal review

- US National Science Foundation (NSF) review panel.
- Reviewer for USDA National Research Initiative Competitive Grants Program, Biotechnology and Biological Sciences Research Council (BBSRC), Research Foundation – Flanders (FWO), and USDA Internal Project.

Manuscript review

- Reviewer for ACS Synthetic Biology, Biotechnology Progress, BMC Bioinformatics, BMC Biotechnology, Critical Reviews in Plant Sciences, Environmental Management, International Journal of Plant Genomics, Journal of Experimental Botany, Journal of Plant Biotechnology, Journal of Proteomic Research, Nature Biotechnology, Nature Plants, New Phytologist, Physiologia Plantarum, Planta, Plant Methods, Plos Computational Biology

Membership

- Member of American Association for the Advancement of Science (2018 - present)

Service

- Editor-in-Chief of BioDesign Research (<https://spj.sciencemag.org/bdr/>) (2019 - present)
- Joint convener of the 1st International BioDesign Research Conference (<https://www.biodesign-conference.com/2020/>)
- Joint convener of 2nd International BioDesign Research Conference (<https://www.biodesign-conference.com/2021/>)
- Joint convener of the 3rd International BioDesign Research Conference (<https://www.confexxiv.com/IBDRC2022/>)
- Co-organizer of the “Genome Biodesign in Plants and Animals” session at the Plant & Animal Genome Conference: PAG 30 (<https://www.intlpag.org/30/>)
- Organizer of the 34th New Phytologist Symposium: Systems biology and ecology of CAM plants. Tahoe City, CA, USA, 15–18 July 2014. (<http://www.newphytologist.org/symposiums/view/5>)
- Editorial Board of Scientific Reports (2018 - 2021)
- Editorial Board of Plants (2019 - present)
- Editorial Board of aBIOTECH (2022 - present)
- Lead guest editor for Special Issue "Genetics, genomics, and evolution of CAM photosynthesis" in Genes. http://www.mdpi.com/journal/genes/special_issues/cam_photosynth
- Lead guest editor for Research Topic entitled “Systems Biology and Synthetic Biology in Relation to Drought Tolerance or Avoidance in Plants” in Frontiers in Plant Science. <http://journal.frontiersin.org/researchtopic/6651/systems-biology-and-synthetic-biology-in-relation-to-drought-tolerance-or-avoidance-in-plants>
- Lead guest editor for a special issue entitled “Plant Comparative and Functional Genomics”. International Journal of Genomics. <http://www.hindawi.com/journals/ijg/si/825361/>
- Leader of the ORNL CAM research team, a key component of the \$14.3 million multi-institutional DOE project to engineer crassulacean acid metabolism (CAM) into C₃ plants to enhance water-use efficiency for sustainable biofuels production on marginal land.

Media Coverage

“Does Agave Hold the Secret to Drought-Resistant Farming?” (July 13, 2015)

<http://www.scientificamerican.com/article/does-agave-hold-the-secret-to-drought-resistant-farming/>

“Can genetic engineering help quench crops’ thirst?” (January 4, 2016)

<http://ensia.com/features/can-genetic-engineering-help-quench-crops-thirst/>

“New study of water-saving plants advances efforts to develop drought-resistant crops” (December 5, 2016)

<https://www.ornl.gov/news/new-study-water-saving-plants-advances-efforts-develop-drought-resistant-crops>

“Small Proteins Secreted by Poplar Roots Form Communication Route with Associated Fungal Communities” (May 10, 2017)

<http://genomicscience.energy.gov/program/berhighlights.shtml>

“SimPath licenses novel ORNL system for enhanced synthetic biology” (October 16, 2017)

<https://www.ornl.gov/news/simpath-licenses-novel-ornl-system-enhanced-synthetic-biology>

“Genes found in drought-resistant plants could accelerate evolution of water-use efficient crops” (December 1, 2017)

<https://www.ornl.gov/news/genes-found-drought-resistant-plants-could-accelerate-evolution-water-use-efficient-crops>

“Researchers Discover Genes That Make Plants Drought-Resistant” (June 21, 2018)

<https://www.rdmag.com/article/2018/06/researchers-discover-genes-make-plants-drought-resistant>

<https://www.rdmag.com/article/2018/07/r-d-special-focus-plant-science>

“Genome Insider Episode 8: A Plantiful Future” (October 13, 2020)

<https://jgi.doe.gov/genome-insider-episode-8-plantiful-future-xiaohan-yang-ornl/>

“Single gene boosts climate resilience, yield and carbon capture in crops” (June 3, 2021)

<https://www.ornl.gov/news/single-gene-boosts-climate-resilience-yield-and-carbon-capture-crops>

“Watching Plants Switch on Genes” (October 7, 2022)

<https://www.energy.gov/science/ber/articles/watching-plants-switch-genes>

“Agave gene delays poplar dormancy” (January 17, 2023)

<https://www.ornl.gov/news/agave-gene-delays-poplar-dormancy>

“Transforming plants into allies in the fight against climate change” (May 23, 2023)

<https://www.ornl.gov/news/transforming-plants-allies-fight-against-climate-change>

“New approach ‘stacks’ genes for faster plant transformation” (June 8, 2023)

<https://www.ornl.gov/news/new-approach-stacks-genes-faster-plant-transformation>

Invention

Patent

- 1) U.S. patent No. US 10,227,601 B2 (Issued: March 12, 2019): “PtDUF266 Gene Regulating Cell Wall Biosynthesis and Recalcitrance in *Populus*”. Inventors: Jin-Gui Chen, Sara Jawdy, Xiaohan Yang, Gerald A. Tuskan, Yongil Yang, Lee E. Gunter
- 2) U.S. patent No. US 10,246,719 B2 (Issued: April 2, 2019): “Modulating Laccase Enzyme to Regulate Cell Wall Biosynthesis and Recalcitrance in Plants”. Inventors: Jin-Gui Chen, Lee E. Gunter, Sara S. Jawdy, Xiaohan Yang, Gerald A. Tuskan, Anthony C. Bryan
- 3) U.S. patent No. US 11,028,404 B2 (Issued: June 8, 2021): “Methods of improving mycorrhization in plants and genetically modified plants with improved mycorrhization”. Inventors: Wellington Muchero, Jessy L Labbe, Lee E Gunter, Jin-Gui Chen, Sara S Jawdy, Xiaohan Yang, Gerald A Tuskan, Juan Wang, Olaf Czarnecki, Priya Ranjan
- 4) U.S. patent No. US 11,041,164 B2 (Issued: June 22, 2021): “Genes for enhancing drought and heat tolerance in plants and methods of use”. Inventors: Xiaohan Yang, Gerald A. Tuskan, Degao Liu, Rongbin Hu, Jin-Gui Chen, Meng Xie
- 5) U.S. patent No. US 11,535,860 B2 (Issued: December 27, 2022) “Genes for enhancing salt and drought tolerance in plants and methods of use”. Inventors: Xiaohan Yang, Degao Liu, Rongbin Hu, Gerald A. Tuskan.
- 6) U.S. patent No. US 11,715,191 B2 (Issued: August 1, 2023) “Method and system for automated plant surveillance and manipulation”. Inventors: Udaya C. Kalluri, Andrzej Nycz, Lonnie J. Love, Vincent C. Paquit, Xiaohan Yang, Samuel C. Leach, Harold Walters
- 7) US Patent No.: 11,725,211 B2 (Issued: August 15, 2023) “TNT Cloning System”. Inventors: Gerald A. Tuskan, Xiaohan Yang, Henrique Cestari De Paoli.

Pending patent

- 1) Yang X, Yuan G, Lu H, Hassan MD, Tuskan GA. “Reporter genes confer new-to-nature ornamental traits in plants” US Provisional Application No. 63/318,939 (Filed date: March 11, 2022)
- 2) Yang X, Liu D, Li Y, Tuskan GA “Year-Round Plant Growth in Warm Conditions” US Provisional Patent App. 63/331,899 (Filed date: April 18, 2022).
- 3) Yang X, Yuan G, Martin S, Hassan MD, Tuskan GA. “Rapid Assembly of gRNA Arrays” US Provisional Application No. 63/345,460 (Filed date: May 25, 2022)
- 4) Yang X, Yuan G, Lu H, Hassan MD, Tuskan GA. “Split Selectable Marker Mediated Gene Stacking” US Provisional Application No. 63/408,485 (Filed date: September 21, 2022)

Invention disclosures

- 1) Invention Disclosure 201403422, DOE S-138,049, “A PtDUF231 Gene Regulating Cell Wall Biosynthesis and Recalcitrance in *Populus*”. (elected for patent application)
- 2) Invention Disclosure 201403416 DOE S-138,043, “A Laccase Enzyme Regulating Cell Wall Biosynthesis and Recalcitrance in *Populus*”.
- 3) Invention Disclosure 201403419, DOE S-138,046, “PtCAD2359 Knockdown Affects the Lignin Biosynthetic Pathway in *Populus*”.
- 4) Invention Disclosure 201403421, DOE S-138,048, “A PtVND6 Gene Regulating Cell Wall Biosynthesis and Recalcitrance in *Populus*.”
- 5) Invention Disclosure 201403424, DOE S-138,051, “A Prolyl 4-Hydroxylase Alpha Subunit Enzyme Regulates Cell Wall Biosynthesis and Recalcitrance in *Populus*”.
- 6) Invention Disclosure 201403434, DOE S-138,061, “A Serine Hydroxymethyltransferase Regulates Cell Wall Biosynthesis and Recalcitrance in *Populus*”.
- 7) Invention Disclosure 201403435, DOE S-138,062, “A Prefoldin-Like Protein Regulates Cell Wall Biosynthesis and Recalcitrance in *Populus*”.

- 8) Invention disclosure 201804142 “Gene for enhancing photosynthetic performance and biomass production in plants”

Invited Talks

- “Genomics of CAM plants: *Kalanchoe* gene atlas and the genomes of *Kalanchoe* and *Agave*”. Plant & Animal Genome Conference: PAG 30 (Session: BER Plant Genomic Science); January 13-18, 2023, San Diego, CA
- “System-level design of plant carbon pump for carbon dioxide removal and utilization on marginal lands”. DOE ARPA-E Carbon Farming Workshop, Kansas City, Missouri; June 29, 2022.
- “How can crassulacean acid metabolism contribute to climate change mitigation?”. The Center for Precision Plant Genomics, University of Minnesota; April 22, 2022.
- “CAM genomics and plant synthetic biology for bioenergy and ecosystem security”. Plant Biology Department, University of Illinois Urbana-Champaign; January 19, 2022.
- “Perspectives on the application of plant synthetic biology in climate change mitigation” at the 2nd International BioDesign Research Conference. (<https://www.biodesign-conference.com/2021>) December 16, 2021.
- “The potential of engineering a ‘Super Plant Carbon Pump’ for carbon dioxide removal”. Climate Change & Ag Innovation Conference, Boston; November 11, 2021.
- “Challenges and opportunities in the application of biosystems design in plants” at the 1st International BioDesign Research Conference. (<https://www.biodesign-conference.com/2020>) December 16, 2020.
- “Biosystems design: the future promise of plant science” at the 7th International Horticulture Research Conference (<http://www.hortres-conference.org/>). July 1, 2020. (Plenary talk)
- “Comparative genomics analysis of drought response between CAM and C₃ photosynthesis plants” International Plant & Animal Genome XXVIII; January 11- 15, 2020, San Diego, CA
- “Can Poplar Plants Use Mobile Protein Signals to Influence Mycorrhizal Fungi?”. International Plant & Animal Genome XXVIII; January 11- 15, 2020, San Diego, CA
- “Application of Genome-Editing in Crassulacean Acid Metabolism (CAM) Plants” aBIOTECH board meeting and the First aBIOTECH International Conference. June 13 – 14, 2019. Beijing, China
- “Expanding the Capabilities for Plant Genome-Editing and Synthetic Biology”. International Plant & Animal Genome XXVII; January 12-16, 2019, San Diego, CA
- “Plant Systems Biology and Biotechnology in Relation to Crassulacean Acid Metabolism”. October 18, 2018, Morgan State University in Baltimore, Maryland
- “Implementation of drought avoidance mechanisms for sustainable crop production”. July 20-24, 2018. The Fifth International Horticulture Research Conference. Beijing, China.
- “An integrative approach to understanding the function of crassulacean acid metabolism (CAM)-related genes in *Agave* and *Kalanchoe*”. April 9-13, 2018. An international symposium entitled “Biology of CAM Plants”. Phoenix, Arizona, USA
- “Unravelling the Molecular Basis of Plant Water-use Efficiency and Plant-microbe Symbiosis”. February 16, 2018. Clemson University.
- “Molecular signatures of crassulacean acid metabolism”. July 23-29, 2017. The XIX International Botanical Congress (IBC2017). Shenzhen, China.
- “Toolbox for plant synthetic biology”. February 16-17, 2017. BBSRC-funded Global Challenges Research Fund (GCRF) Workshop titled “Exploring synthetic biology for enhanced plant production”, University of Liverpool, UK

- “Systems Biology and Synthetic Biology of Crassulacean Acid Metabolism”. April 13, 2016. BCMB 615 Seminar Series, University of Tennessee, Knoxville, TN
- “Comparative Evolution of Crassulacean Acid Metabolism (CAM)”. The Plant and Animal Genome Conference; January 2016 in San Diego, CA.
- “Discovery of effector-like proteins in *Populus* during symbiosis formation”. IUFRO Tree Biotechnology Conference. 8-12 June 2015, Florence, Italy.
- “Genome-wide discovery of non-coding RNAs in willow (*Salix purpurea*)”. The Plant and Animal Genome Conference XXIII. 10-14 January 2015, San Diego, CA, USA.
- “Comparative genomics of CAM plants” The 34th New Phytologist Symposium: Systems biology and ecology of CAM plants; Tahoe City, CA, USA 15–18 July 2014
- “Comparative genomics of CAM species” The Plant and Animal Genome XXII Conference; January 11-15, 2014 in San Diego, CA
- “*Agave* genomics in support of CAM engineering”. International Symposium on C₄ and CAM Plant Biology (August 6-9, 2013, Champaign, IL).

Publications (A total of 139; “*” indicates corresponding author)

139. J. Zhang, X. Wang, H.-T. Wang, Z. Qiao, T. Yao, M. Xie, B. R. Urbanowicz, W. Zeng, S. S. Jawdy, L. E. Gunter, **X. Yang**, O. Czarnecki, S. Regan, A. Seguin, W. Rottmann, K. A. Winkeler, R. Sykes, A. Lipzen, C. Daum, K. Barry, M.-Z. Lu, G. A. Tuskan, W. Muchero, J.-G. Chen, Overexpression of REDUCED WALL ACETYLATION C increases xylan acetylation and biomass recalcitrance in *Populus*. *Plant Physiology*, (2023). doi: 10.1093/plphys/kiad377
138. G. Yuan, G. A. Tuskan*, **X. Yang***, Use of fluorescent protein reporters for assessing and detecting genome editing reagents and transgene expression in plants. in *Plant Genome Engineering: Methods and Protocols*, B. Yang, W. Harwood, Q. Que, Eds. (Springer US, New York, NY, 2023), pp. 115-127. doi: 10.1007/978-1-0716-3131-7_8
137. G. Yuan, H. Lu, K. De, M. M. Hassan, Y. Liu, M. T. Islam, W. Muchero, G. A. Tuskan*, **X. Yang***, Split selectable marker systems utilizing inteins facilitate gene stacking in plants. *Communications Biology* **6**, 567 (2023). doi: 10.1038/s42003-023-04950-8
136. G. Yuan, Y. Liu, T. Yao, W. Muchero, J.-G. Chen, G. A. Tuskan*, **X. Yang***, eYGFpuv-assisted transgenic selection in *Populus deltoides* WV94 and multiplex genome editing in protoplasts of *P. trichocarpa* x *P. deltoides* clone "52-225". *Plants* **12**, 1657 (2023). doi: 10.3390/plants12081657
135. T. Yao, G. Yuan, H. Lu, Y. Liu, J. Zhang, G. A. Tuskan, W. Muchero*, J.-G. Chen*, **X. Yang***, CRISPR/Cas9-based gene activation and base editing in *Populus*. *Horticulture Research* **10**, (2023). doi: 10.1093/hr/uhad085
134. A. Sreedasyam, C. Plott, M. S. Hossain, John T. Lovell, J. Grimwood, Jerry W. Jenkins, C. Daum, K. Barry, J. Carlson, S. Shu, J. Phillips, M. Amirebrahimi, M. Zane, M. Wang, D. Goodstein, Fabian B. Haas, M. Hiss, P.-F. Perroud, Sara S. Jawdy, Y. Yang, R. Hu, J. Johnson, J. Kropat, Sean D. Gallaher, A. Lipzen, Eugene V. Shakirov, X. Weng, I. Torres-Jerez, B. Weers, D. Conde, Marilia R. Pappas, L. Liu, A. Muchlinski, H. Jiang, C. Shyu, P. Huang, J. Sebastian, C. Laiben, A. Medlin, S. Carey, Alyssa A. Carrell, J.-G. Chen, M. Perales, K. Swaminathan, I. Allona, D. Grattapaglia, Elizabeth A. Cooper, D. Tholl, John P. Vogel, D. J. Weston, **X. Yang**, Thomas P. Brutnell, Elizabeth A. Kellogg, I. Baxter, M. Udvardi, Y. Tang, Todd C. Mockler, Thomas E. Juenger, J. Mullet, Stefan A. Rensing, Gerald A. Tuskan, Sabeeha S. Merchant, G. Stacey, J. Schmutz, JGI Plant Gene Atlas: an updateable transcriptome resource to improve functional gene descriptions across the plant kingdom. *Nucleic Acids Research*, (2023). doi: 10.1093/nar/gkad616

133. Y. Liu, G. Yuan, B. Hyden, G. A. Tuskan, P. E. Abraham*, **X. Yang***, Expanding the application of anti-CRISPR proteins in plants for tunable genome editing. *Plant Physiology* **192**, 60-64 (2023). doi: 10.1093/plphys/kiad076
132. D. Liu, D. Tang, M. Xie, J. Zhang, L. Zhai, J. Mao, C. Luo, A. Lipzen, Y. Zhang, E. Savage, G. Yuan, H.-B. Guo, D. Tadesse, R. Hu, S. Jawdy, H. Cheng, L. Li, H. Yer, M. M. Clark, H. Sun, J. Shi, R. Budhathoki, R. Kumar, T. Kamuda, Y. Li, C. Pennacchio, K. Barry, J. Schmutz, R. Berry, W. Muchero, J.-G. Chen, Y. Li, G. A. Tuskan, **X. Yang***, *Agave REVELLE1* regulates the onset and release of seasonal dormancy in *Populus*. *Plant Physiology* **191**, 1492-1504 (2023). doi: 10.1093/plphys/kiac588
131. C. Li, W. Huang, X. Han, G. Zhao, W. Zhang, W. He, B. Nie, X. Chen, T. Zhang, W. Bai, X. Zhang, J. He, C. Zhao, A. R. Fernie, T. J. Tschaplinski, **X. Yang***, S. Yan*, L. Wang*, Diel dynamics of multi-omics in elkhorn fern provide new insights into weak CAM photosynthesis. *Plant Communications*, 100594 (2023). doi: 10.1016/j.xplc.2023.100594
130. M. M. Hassan, S. Martin, K. Feng, T. B. Yates, G. Yuan, M. Z. Martin, S. Martin, W. Muchero, N. A. Griffiths, D. J. Weston*, **X. Yang***, Genome-wide identification and functional prediction of silicon (Si) transporters in poplar (*Populus trichocarpa*). *Plant Biotechnology Reports* **17**, 285-302 (2023). doi: 10.1007/s11816-022-00788-4
129. E. G. Brooks, E. Elorriaga, Y. Liu, J. R. Duduit, G. Yuan, C.-J. Tsai, G. A. Tuskan, T. G. Ranney, **X. Yang***, W. Liu*, Plant promoters and terminators for high-precision bioengineering. *BioDesign Research* **5**, 0013 (2023). doi: 10.34133/bdr.0013
128. G. Yuan, S. Martin, M. M. Hassan, G. A. Tuskan*, **X. Yang***, PARA: A new platform for the rapid assembly of gRNA arrays for multiplexed CRISPR technologies. *Cells* **11**, 2467 (2022). doi: 10.3390/cells11162467
127. G. Yuan, H. Lu, D. J. Weston, S. Jawdy, T. J. Tschaplinski, G. A. Tuskan*, **X. Yang***, Reporter genes confer new-to-nature ornamental traits in plants. *Horticulture Research* **9**, uhac077 (2022). doi: 10.1093/hr/uhac077
126. G. Yuan, H. Lu, K. De, M. M. Hassan, Y. Liu, Y. Li, W. Muchero, P. E. Abraham, G. A. Tuskan*, **X. Yang***, An Intein-Mediated Split-nCas9 System for Base Editing in Plants. *ACS Synthetic Biology* **11**, 2513-2517 (2022). doi: 10.1021/acssynbio.1c00507
125. S. Tan, Y. Liang, Y. Huang, J. Xi, X. Huang*, **X. Yang***, K. Yi*, Phylogeny and expression atlas of the NITRATE TRANSPORTER 1/PEPTIDE TRANSPORTER FAMILY in *Agave*. *Plants* **11**, 1434 (2022). doi: 10.3390/plants11111434
124. R. S. Payyavula, R. Badmi, S. S. Jawdy, M. Rodriguez Jr, L. Gunter, R. W. Sykes, K. A. Winkeler, C. M. Collins, W. H. Rottmann, J.-G. Chen, **X. Yang**, G. A. Tuskan, U. C. Kalluri*, Biomass formation and sugar release efficiency of *Populus* modified by altered expression of a NAC transcription factor. *Plant Direct* **6**, e419 (2022). doi: 10.1002/pld3.419
123. Y. Liu, G. Yuan, M. M. Hassan, P. E. Abraham, J. C. Mitchell, D. Jacobson, G. A. Tuskan, A. Khakhar, J. Medford, C. Zhao, C.-J. Liu, C. A. Eckert, M. J. Doktycz, T. J. Tschaplinski, **X. Yang***, Biological and molecular components for genetically engineering biosensors in plants. *BioDesign Research* **2022**, 9863496 (2022). doi: 10.34133/2022/9863496
122. B. Hyden, G. Yuan, Y. Liu, L. B. Smart, G. A. Tuskan, **X. Yang***, Protoplast-based transient expression and gene editing in shrub willow (*Salix purpurea* L.). *Plants* **11**, 3490 (2022). doi: 10.3390/plants11243490
121. X. Huang, B. Xu, S. Tan, Y. Huang, J. Xi, X. Qin, T. Chen, H. Chen, **X. Yang***, K. Yi*, Transcriptome sequencing of *Agave angustifolia* reveals conservation and diversification in the expression of cinnamyl alcohol dehydrogenase genes in *Agave* species. *Agriculture* **12**, 1003 (2022). doi: 10.3390/agriculture12071003

120. X.-L. Hu, J. Zhang, R. Kaundal, R. Kataria, J. L. Labbé, J. C. Mitchell, T. J. Tschaplinski, G. A. Tuskan, Z.-M. Cheng*, **X. Yang***, Diversity and conservation of plant small secreted proteins associated with arbuscular mycorrhizal symbiosis. *Horticulture Research* **9**, uhac043 (2022). doi: 10.1093/hr/uhac043
119. R. Hu, J. Zhang, S. Jawdy, A. Sreedasyam, A. Lipzen, M. Wang, V. Ng, C. Daum, K. Keymanesh, D. Liu, H. Lu, P. Ranjan, J.-G. Chen, W. Muchero, T. J. Tschaplinski, G. A. Tuskan, J. Schmutz, **X. Yang***, Comparative genomics analysis of drought response between obligate CAM and C₃ photosynthesis plants. *Journal of Plant Physiology* **277**, 153791 (2022). doi: 10.1016/j.jplph.2022.153791
118. M. M. Hassan, G. Yuan, Y. Liu, M. Alam, C. A. Eckert, G. A. Tuskan, J. F. Golz*, **X. Yang***, Precision genome editing in plants using gene targeting and prime editing: existing and emerging strategies. *Biotechnology Journal* **17**, e2100673 (2022). doi: 10.1002/biot.202100673
117. G. Chai, M. Lu, **X. Yang**, T. Demura, W. Li, Q. Li, Editorial: Wood Development and Physiology in a Changing Climate. *Frontiers in Plant Science* **13**, 906736 (2022). doi: 10.3389/fpls.2022.906736
116. G. Yuan, H. Lu, D. Tang, M. M. Hassan, Y. Li, J.-G. Chen, G. A. Tuskan*, **X. Yang***, Expanding the application of a UV-visible reporter for transient gene expression and stable transformation in plants. *Horticulture Research* **8**, 234 (2021). doi: 10.1038/s41438-021-00663-3
115. G. Yuan, M. M. Hassan, T. Yao, H. Lu, M. M. Vergara, J. L. Labbé, W. Muchero, C. Pan, J.-G. Chen, G. A. Tuskan, Y. Qi, P. E. Abraham*, **X. Yang***, Plant-based biosensors for detecting CRISPR-mediated genome engineering. *ACS Synthetic Biology* **10**, 3600-3603 (2021). doi: 10.1021/acssynbio.1c00455
114. **X. Yang***, 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. Wulschleger, G. A. Tuskan, Biological parts for plant biodesign to enhance land-based carbon dioxide removal. *BioDesign Research* **2021**, 9798714 (2021). doi: 10.34133/2021/9798714
113. F. Tian, X.-L. Hu, T. Yao, **X. Yang**, J.-G. Chen, M.-Z. Lu, J. Zhang*, Recent advances in the roles of HSFs and HSPs in heat stress response in woody plants. *Frontiers in Plant Science* **12**, 1319 (2021). doi: 10.3389/fpls.2021.704905
112. H. K. Shrestha, M. I. V. Solis, S. S. Jawdy, G. A. Tuskan, **X. Yang**, P. E. Abraham*, Temporal dynamics of protein and post-translational modification abundances in *Populus* leaf across a diurnal period. *Proteomics* **21**, 2100127 (2021). doi: 10.1002/pmic.202100127
111. R. C. Moseley, F. Motta, G. A. Tuskan, S. B. Haase, **X. Yang***, Inference of gene regulatory network uncovers the linkage between circadian clock and crassulacean acid metabolism in *Kalanchoë fedtschenkoi*. *Cells* **10**, 2217 (2021). doi: 10.3390/cells10092217
110. D. Liu, R. Hu, J. Zhang, H.-B. Guo, H. Cheng, L. Li, A. M. Borland, H. Qin, J.-G. Chen, W. Muchero, G. A. Tuskan, **X. Yang***, Overexpression of an *Agave* phosphoenolpyruvate carboxylase improves plant growth and stress tolerance. *Cells* **10**, 582 (2021). doi: 10.3390/cells10030582
109. Z. Hu, Z. Nie, C. Yan, H. Huang, X. Ma, Y. Wang, N. Ye, G. A. Tuskan, **X. Yang**, H. Yin*, Transcriptome and degradome profiling reveals a role of miR530 in the circadian regulation of gene expression in *Kalanchoë marnieriana*. *Cells* **10**, 1526 (2021). doi: 10.3390/cells10061526

108. X.-L. Hu, H. Lu, M. M. Hassan, J. Zhang, G. Yuan, P. E. Abraham, H. K. Shrestha, M. I. Villalobos Solis, J.-G. Chen, T. J. Tschaplinski, M. J. Doktycz, G. A. Tuskan, Z.-M. Cheng*, **X. Yang***, Advances and perspectives in discovery and functional analysis of small secreted proteins in plants. *Horticulture Research* **8**, 130 (2021). doi: 10.1038/s41438-021-00570-7
107. M. M. Hassan, Y. Zhang, G. Yuan, K. De, J.-G. Chen, W. Muchero, G. A. Tuskan, Y. Qi*, **X. Yang***, Construct design for CRISPR/Cas-based genome editing in plants. *Trends in Plant Science* **26**, 1133-1152 (2021). doi: 10.1016/j.tplants.2021.06.015
106. J. Zhang, M. Xie, M. Li, J. Ding, Y. Pu, A. C. Bryan, W. Rottmann, K. A. Winkeler, C. M. Collins, V. Singan, E. A. Lindquist, S. S. Jawdy, L. E. Gunter, N. L. Engle, **X. Yang**, K. Barry, T. J. Tschaplinski, J. Schmutz, G. A. Tuskan, W. Muchero*, J.-G. Chen*, Overexpression of a Prefoldin β subunit gene reduces biomass recalcitrance in the bioenergy crop *Populus*. *Plant Biotechnology Journal* **18**, 859-871 (2020). doi: 10.1111/pbi.13254
105. J. Zhang, R. Hu, A. Sreedasyam, T. M. Garcia, A. Lipzen, M. Wang, P. Yerramsetty, D. Liu, V. Ng, J. Schmutz, J. C. Cushman, A. M. Borland, A. Pasha, N. J. Provart, J.-G. Chen, W. Muchero, G. A. Tuskan, **X. Yang***, Light-responsive expression atlas reveals the effects of light quality and intensity in *Kalanchoë fedtschenkoi*, a plant with crassulacean acid metabolism. *GigaScience* **9**, gaaa018 (2020). doi: 10.1093/gigascience/gaaa018
104. G. Yuan, M. M. Hassan, D. Liu, S. D. Lim, W. C. Yim, J. C. Cushman, K. Markel, P. M. Shih, H. Lu, D. J. Weston, J.-G. Chen, T. J. Tschaplinski, G. A. Tuskan, **X. Yang***, Biosystems design to accelerate C_3 -to-CAM progression. *BioDesign Research* **2020**, 3686791 (2020). doi: 10.34133/2020/3686791
103. **X. Yang***, J. I. Medford, K. Markel, P. M. Shih, H. C. De Paoli, C. T. Trinh, A. J. McCormick, R. Ployet, S. G. Hussey, A. A. Myburg, P. E. Jensen, M. M. Hassan, J. Zhang, W. Muchero, U. C. Kalluri, H. Yin, R. Zhuo, P. E. Abraham, J.-G. Chen, D. J. Weston, Y. Yang, D. Liu, Y. Li, J. Labbe, B. Yang, J. H. Lee, R. W. Cottingham, S. Martin, M. Lu, T. J. Tschaplinski, G. Yuan, H. Lu, P. Ranjan, J. C. Mitchell, S. D. Wullschleger, G. A. Tuskan, Plant biosystems design research roadmap 1.0. *BioDesign Research* **2020**, 8051764 (2020). doi: 10.34133/2020/8051764
102. **X. Yang***, J. C. Cushman, A. M. Borland, Q. Liu, Editorial: Systems biology and synthetic biology in relation to drought tolerance or avoidance in plants. *Frontiers in Plant Science* **11**, 394 (2020). doi: 10.3389/fpls.2020.00394
101. H. Lu, G. Yuan, S. H. Strauss, T. J. Tschaplinski, G. A. Tuskan, J.-G. Chen*, **X. Yang***, Reconfiguring plant metabolism for biodegradable plastic production. *BioDesign Research* **2020**, 9078303 (2020). doi: 10.34133/2020/9078303
100. U. C. Kalluri, **X. Yang**, S. D. Wullschleger*, Plant biosystems design for a carbon-neutral bioeconomy. *BioDesign Research* **2020**, 7914051 (2020). doi: 10.34133/2020/7914051
99. M. M. Hassan, G. Yuan, J.-G. Chen, G. A. Tuskan, **X. Yang***, Prime editing technology and its prospects for future applications in plant biology research. *BioDesign Research* **2020**, 9350905 (2020). doi: 10.34133/2020/9350905
98. C. DeLisi*, A. Patrinos*, M. MacCracken, D. Drell, G. Annas, A. Arkin, G. Church, R. Cook-Deegan, H. Jacoby, M. Lidstrom, J. Melillo, R. Milo, K. Paustian, J. Reilly, R. J. Roberts, D. Segrè, S. Solomon, D. Woolf, S. D. Wullschleger, **X. Yang**, The role of synthetic biology in atmospheric greenhouse gas reduction: prospects and challenges. *BioDesign Research* **2020**, 1016207 (2020). doi: 10.34133/2020/1016207
97. J. Zhang, M. Li, A. C. Bryan, C. G. Yoo, W. Rottmann, K. A. Winkeler, Cassandra M. Collins, V. Singan, E. A. Lindquist, S. S. Jawdy, L. E. Gunter, N. L. Engle, **X. Yang**, K. Barry, T. J. Tschaplinski, J. Schmutz, Y. Pu, A. J. Ragauskas, G. A. Tuskan, W. Muchero*, J.-G. Chen*,

- Overexpression of a serine hydroxymethyltransferase increases biomass production and reduces recalcitrance in the bioenergy crop *Populus*. *Sustainable Energy & Fuels* **3**, 195-207 (2019). doi: 10.1039/C8SE00471D
96. **X. Yang***, L. S. Qi*, A. Jaramillo*, Z.-M. Cheng*, Biodesign research to advance the principles and applications of biosystems design. *BioDesign Research* **2019**, 9680853 (2019). doi: 10.34133/2019/9680853
 95. **X. Yang***, D. Liu, T. J. Tschaplinski, G. A. Tuskan, Comparative genomics can provide new insights into the evolutionary mechanisms and gene function in CAM plants. *Journal of Experimental Botany* **70**, 6539-6547 (2019). doi: 10.1093/jxb/erz408
 94. Y. Yang, C. G. Yoo, W. Rottmann, K. A. Winkeler, C. M. Collins, L. E. Gunter, S. S. Jawdy, **X. Yang**, Y. Pu, A. J. Ragauskas, G. A. Tuskan, J.-G. Chen*, PdWND3A, a wood-associated NAC domain-containing protein, affects lignin biosynthesis and composition in *Populus*. *BMC Plant Biology* **19**, 486 (2019). doi: 10.1186/s12870-019-2111-5
 93. X. Wang, X. Chen, Q. Cheng, K. Zhu, **X. Yang**, Z. Cheng*, *Agrobacterium*–mediated transformation of *Kalanchoe laxiflora*. *Horticultural Plant Journal* **5**, 221-228 (2019). doi: 10.1016/j.hpj.2019.07.001
 92. T. J. Tschaplinski*, P. E. Abraham, S. S. Jawdy, L. E. Gunter, M. Z. Martin, N. L. Engle, **X. Yang**, G. A. Tuskan, The nature of the progression of drought stress drives differential metabolomic responses in *Populus deltoides*. *Annals of Botany* **124**, 617-626 (2019). doi: 10.1093/aob/mcz002
 91. R. C. Moseley, G. A. Tuskan, **X. Yang***, Comparative genomics analysis provides new insight into molecular basis of stomatal movement in *Kalanchoë fedtschenkoi*. *Frontiers in Plant Science* **10**, 292 (2019). doi: 10.3389/fpls.2019.00292
 90. R. Mewalal, H. Yin, R. Hu, S. Jawdy, P. Vion, G. A. Tuskan, F. Le Tacon, J. L. Labbé*, **X. Yang***, Identification of *Populus* small RNAs responsive to mutualistic interactions with mycorrhizal fungi, *Laccaria bicolor* and *Rhizophagus irregularis*. *Frontiers in Microbiology* **10**, 515 (2019). doi: 10.3389/fmicb.2019.00515
 89. D. Liu, M. Chen, B. Mendoza, H. Cheng, R. Hu, L. Li, C. T. Trinh, G. A. Tuskan, **X. Yang***, CRISPR/Cas9-mediated targeted mutagenesis for functional genomics research of crassulacean acid metabolism plants. *Journal of Experimental Botany* **70**, 6621-6629 (2019). doi: 10.1093/jxb/erz415
 88. J. Labbé, W. Muchero, O. Czarnecki, J. Wang, X. Wang, A. C. Bryan, K. Zheng, Y. Yang, M. Xie, J. Zhang, D. Wang, P. Meidl, H. Wang, J. L. Morrell-Falvey, K. R. Cope, L. G. S. Maia, J.-M. Ané, R. Mewalal, S. S. Jawdy, L. E. Gunter, W. Schackwitz, J. Martin, F. Le Tacon, T. Li, Z. Zhang, P. Ranjan, E. Lindquist, **X. Yang**, D. A. Jacobson, T. J. Tschaplinski, K. Barry, J. Schmutz, J.-G. Chen*, G. A. Tuskan, Mediation of plant–mycorrhizal interaction by a lectin receptor-like kinase. *Nature Plants* **5**, 676-680 (2019). doi: 10.1038/s41477-019-0469-x
 87. H.-B. Guo, Y. Ma, G. A. Tuskan, H. Qin, **X. Yang***, H. Guo*, A suggestion of converting protein intrinsic disorder to structural entropy using shannon’s information theory. *Entropy* **21**, 591 (2019). doi: 10.3390/e21060591
 86. H. B. Chhetri, D. Macaya-Sanz, D. Kainer, A. K. Biswal, L. M. Evans, J.-G. Chen, C. Collins, K. Hunt, S. S. Mohanty, T. Rosenstiel, D. Ryno, K. Winkeler, **X. Yang**, D. Jacobson, D. Mohnen, W. Muchero, S. H. Strauss, T. J. Tschaplinski, G. A. Tuskan, S. P. DiFazio*, Multitrait genome-wide association analysis of *Populus trichocarpa* identifies key polymorphisms controlling morphological and physiological traits. *New Phytologist* **223**, 293-309 (2019). doi: 10.1111/nph.15777

85. H. Yin, H.-B. Guo, D. J. Weston, A. M. Borland, P. Ranjan, P. E. Abraham, S. S. Jawdy, J. Wachira, G. A. Tuskan, T. J. Tschaplinski, S. D. Wulfschleger, H. Guo, R. L. Hettich, S. M. Gross, Z. Wang, A. Visel, **X. Yang***, Diel rewiring and positive selection of ancient plant proteins enabled evolution of CAM photosynthesis in *Agave*. *BMC Genomics* **19**, 588 (2018). doi: 10.1186/s12864-018-4964-7
84. R. C. Moseley, R. Mewalal, F. Motta, G. A. Tuskan, S. Haase, **X. Yang***, Conservation and diversification of circadian rhythmicity between a model crassulacean acid metabolism plant *Kalanchoë fedtschenkoi* and a model C₃ photosynthesis plant *Arabidopsis thaliana*. *Frontiers in Plant Science* **9**, 1757 (2018). doi: 10.3389/fpls.2018.01757
83. D. Liu, K. J. Palla, R. Hu, R. C. Moseley, C. Mendoza, M. Chen, P. E. Abraham, J. L. Labbé, U. C. Kalluri, T. J. Tschaplinski, J. C. Cushman, A. M. Borland, G. A. Tuskan, **X. Yang***, Perspectives on the basic and applied aspects of crassulacean acid metabolism (CAM) research. *Plant Science* **274**, 394-401 (2018). doi: 10.1016/j.plantsci.2018.06.012
82. S. D. Lim, W. C. Yim, D. Liu, R. Hu, **X. Yang**, J. C. Cushman*, A *Vitis vinifera* basic helix-loop-helix transcription factor enhances plant cell size, vegetative biomass and reproductive yield. *Plant Biotechnology Journal* **16**, 1595-1615 (2018). doi: 10.1111/pbi.12898
81. H.-B. Guo, Y. Ma, G. A. Tuskan, **X. Yang***, H. Guo*, Classification of complete proteomes of different organisms and protein sets based on their protein distributions in terms of some key attributes of proteins. *International Journal of Genomics* **2018**, 9784161 (2018). doi: 10.1155/2018/9784161
80. B. J. Garcia, J. L. Labbé, P. Jones, P. E. Abraham, I. Hodge, S. Climer, S. Jawdy, L. Gunter, G. A. Tuskan, **X. Yang**, T. J. Tschaplinski, D. A. Jacobson*, Phytobiome and transcriptional adaptation of *Populus deltoides* to acute progressive drought and cyclic drought. *Phytobiomes Journal* **2**, 249-260 (2018). doi: 10.1094/pbiomes-04-18-0021-r
79. A. M. Borland*, A. Leverett, N. Hurtado-Castano, R. Hu, **X. Yang**, Functional Anatomical Traits of the Photosynthetic Organs of Plants with Crassulacean Acid Metabolism. in *The Leaf: A Platform for Performing Photosynthesis*, W. W. Adams Iii, I. Terashima, Eds. (Springer International Publishing, Cham, 2018), pp. 281-305. doi: 10.1007/978-3-319-93594-2_10
78. A. K. Biswal, M. A. Atmodjo, S. Pattathil, R. A. Amos, **X. Yang**, K. Winkeler, C. Collins, S. S. Mohanty, D. Ryno, L. Tan, I. Gelineo-Albersheim, K. Hunt, R. W. Sykes, G. B. Turner, A. Ziebell, M. F. Davis, S. R. Decker, M. G. Hahn, D. Mohnen*, Working towards recalcitrance mechanisms: increased xylan and homogalacturonan production by overexpression of *GA*lactUronosylTransferase12 (*GAUT12*) causes increased recalcitrance and decreased growth in *Populus*. *Biotechnology for Biofuels* **11**, 9 (2018). doi: 10.1186/s13068-017-1002-y
77. A. K. Biswal, M. A. Atmodjo, M. Li, H. L. Baxter, C. G. Yoo, Y. Pu, Y.-C. Lee, M. Mazarei, I. M. Black, J.-Y. Zhang, H. Ramanna, A. L. Bray, Z. R. King, P. R. LaFayette, S. Pattathil, B. S. Donohoe, S. S. Mohanty, D. Ryno, K. Yee, O. A. Thompson, M. Rodriguez Jr, A. Dumitrache, J. Natzke, K. Winkeler, C. Collins, **X. Yang**, L. Tan, R. W. Sykes, E. L. Gjersing, A. Ziebell, G. B. Turner, S. R. Decker, M. G. Hahn, B. H. Davison, M. K. Udvardi, J. R. Mielenz, M. F. Davis, R. S. Nelson, W. A. Parrott, A. J. Ragauskas, C. Neal Stewart Jr, D. Mohnen*, Sugar release and growth of biofuel crops are improved by downregulation of pectin biosynthesis. *Nature Biotechnology* **36**, 249 (2018). doi: 10.1038/nbt.4067
76. R. Badmi, R. S. Payyavula, G. Bali, H.-B. Guo, S. S. Jawdy, L. E. Gunter, **X. Yang**, K. A. Winkeler, C. Collins, W. H. Rottmann, K. Yee, M. Rodriguez, R. W. Sykes, S. R. Decker, M. F. Davis, A. J. Ragauskas, G. A. Tuskan, U. C. Kalluri*, A new calmodulin-binding protein

- expresses in the context of secondary cell wall biosynthesis and impacts biomass properties in *Populus*. *Frontiers in Plant Science* **9**, 1669 (2018). doi: 10.3389/fpls.2018.01669
75. P. E. Abraham, B. J. Garcia, L. E. Gunter, S. S. Jawdy, N. Engle, **X. Yang**, D. A. Jacobson, R. L. Hettich, G. A. Tuskan, T. J. Tschaplinski*, Quantitative proteome profile of water deficit stress responses in eastern cottonwood (*Populus deltoides*) leaves. *PLOS ONE* **13**, e0190019 (2018). doi: 10.1371/journal.pone.0190019
 74. **X. Yang***, R. Hu, H. Yin, J. Jenkins, S. Shu, H. Tang, D. Liu, D. A. Weighill, W. Cheol Yim, J. Ha, K. Heyduk, D. M. Goodstein, H.-B. Guo, R. C. Moseley, E. Fitzek, S. Jawdy, Z. Zhang, M. Xie, J. Hartwell, J. Grimwood, P. E. Abraham, R. Mewalal, J. D. Beltrán, S. F. Boxall, L. V. Dever, K. J. Palla, R. Albion, T. Garcia, J. A. Mayer, S. Don Lim, C. Man Wai, P. Peluso, R. Van Buren, H. C. De Paoli, A. M. Borland, H. Guo, J.-G. Chen, W. Muchero, Y. Yin, D. A. Jacobson, T. J. Tschaplinski, R. L. Hettich, R. Ming, K. Winter, J. H. Leebens-Mack, J. A. C. Smith, J. C. Cushman, J. Schmutz, G. A. Tuskan, The *Kalanchoë* genome provides insights into convergent evolution and building blocks of crassulacean acid metabolism. *Nature Communications* **8**, 1899 (2017). doi: 10.1038/s41467-017-01491-7
 73. Y. Yang, C. G. Yoo, K. A. Winkeler, C. M. Collins, M. A. W. Hinchey, S. S. Jawdy, L. E. Gunter, N. L. Engle, Y. Pu, **X. Yang**, T. J. Tschaplinski, A. J. Ragauskas, G. A. Tuskan, J.-G. Chen*, Overexpression of a Domain of Unknown Function 231-containing protein increases O-xylan acetylation and cellulose biosynthesis in *Populus*. *Biotechnology for Biofuels* **10**, 311 (2017). doi: 10.1186/s13068-017-0998-3
 72. Y. Yang, C. G. Yoo, H.-B. Guo, W. Rottmann, K. A. Winkeler, C. M. Collins, L. E. Gunter, S. S. Jawdy, **X. Yang**, H. Guo, Y. Pu, A. J. Ragauskas, G. A. Tuskan, J.-G. Chen*, Overexpression of a Domain of Unknown Function 266-containing protein results in high cellulose content, reduced recalcitrance, and enhanced plant growth in the bioenergy crop *Populus*. *Biotechnology for Biofuels* **10**, 74 (2017). doi: 10.1186/s13068-017-0760-x
 71. J. M. Plett, H. Yin, R. Mewalal, R. Hu, T. Li, P. Ranjan, S. Jawdy, H. C. De Paoli, G. Butler, T. M. Burch-Smith, H.-B. Guo, C. Ju Chen, A. Kohler, I. C. Anderson, J. L. Labbé, F. Martin, G. A. Tuskan, **X. Yang***, *Populus trichocarpa* encodes small, effector-like secreted proteins that are highly induced during mutualistic symbiosis. *Scientific Reports* **7**, 382 (2017). doi: 10.1038/s41598-017-00400-8
 70. D. Liu, R. Mewalal, R. Hu, G. A. Tuskan, **X. Yang***, New technologies accelerate the exploration of non-coding RNAs in horticultural plants. *Horticulture Research* **4**, 17031 (2017). doi: 10.1038/hortres.2017.31
 69. D. Close*, M. Rodriguez, R. Hu, **X. Yang**, Disposition and bioavailability of inulin and free sugar in untreated and dilute acid pretreated *Agave tequilana* leaves. *Biomass and Bioenergy* **106**, 176-181 (2017). doi: 10.1016/j.biombioe.2017.08.032
 68. Y. Yang, J. Labbé, W. Muchero, **X. Yang**, S. S. Jawdy, M. Kennedy, J. Johnson, A. Sreedasyam, J. Schmutz, G. A. Tuskan, J.-G. Chen*, Genome-wide analysis of lectin receptor-like kinases in *Populus*. *BMC Genomics* **17**, 699 (2016). doi: 10.1186/s12864-016-3026-2
 67. P. Qian*, H.-B. Guo, Y. Yue, L. Wang, **X. Yang**, H. Guo*, Understanding the catalytic mechanism of xanthosine methyltransferase in caffeine biosynthesis from QM/MM molecular dynamics and free energy simulations. *Journal of Chemical Information and Modeling* **56**, 1755-1761 (2016). doi: 10.1021/acs.jcim.6b00153
 66. D. Liu, R. Hu, K. J. Palla, G. A. Tuskan, **X. Yang***, Advances and perspectives on the use of CRISPR/Cas9 systems in plant genomics research. *Current Opinion in Plant Biology* **30**, 70-77 (2016). doi: 10.1016/j.pbi.2016.01.007

65. C. E. Hamilton*, J. D. Bever, J. Labbé, **X. Yang**, H. Yin, Mitigating climate change through managing constructed-microbial communities in agriculture. *Agriculture, Ecosystems & Environment* **216**, 304-308 (2016). doi: 10.1016/j.agee.2015.10.006
64. H. C. De Paoli, G. A. Tuskan, **X. Yang***, An innovative platform for quick and flexible joining of assorted DNA fragments. *Scientific Reports* **6**, 19278 (2016). doi: 10.1038/srep19278
63. O. Czarnecki*, A. C. Bryan, S. S. Jawdy, **X. Yang**, Z.-M. Cheng, J.-G. Chen, G. A. Tuskan, Simultaneous knockdown of six non-family genes using a single synthetic RNAi fragment in *Arabidopsis thaliana*. *Plant Methods* **12**, 16 (2016). doi: 10.1186/s13007-016-0116-8
62. A. C. Bryan, S. Jawdy, L. Gunter, E. Gjersing, R. Sykes, M. A. W. Hinchee, K. A. Winkeler, C. M. Collins, N. Engle, T. J. Tschaplinski, **X. Yang**, G. A. Tuskan, W. Muchero*, J.-G. Chen*, Knockdown of a laccase in *Populus deltoides* confers altered cell wall chemistry and increased sugar release. *Plant Biotechnology Journal* **14**, 2010-2020 (2016). doi: 10.1111/pbi.12560
61. A. M. Borland*, H.-B. Guo, **X. Yang**, J. C. Cushman, Orchestration of carbohydrate processing for crassulacean acid metabolism. *Current Opinion in Plant Biology* **31**, 118-124 (2016). doi: 10.1016/j.pbi.2016.04.001
60. P. E. Abraham, H. Yin, A. M. Borland, D. Weighill, S. D. Lim, H. C. De Paoli, N. Engle, P. C. Jones, R. Agh, D. J. Weston, S. D. Wulschleger, T. Tschaplinski, D. Jacobson, J. C. Cushman, R. L. Hettich, G. A. Tuskan, **X. Yang***, Transcript, protein and metabolite temporal dynamics in the CAM plant *Agave*. *Nature Plants* **2**, 16178 (2016). doi: 10.1038/nplants.2016.178
59. J. Yao, H. Guo, **X. Yang***, PPCM: Combining multiple classifiers to improve protein-protein interaction prediction. *International Journal of Genomics* **2015**, 608042 (2015). doi: 10.1155/2015/608042
58. J. Yao, H. Guo, M. Chaiprasongsuk, N. Zhao, F. Chen, **X. Yang**, H. Guo*, Substrate-assisted catalysis in the reaction catalyzed by salicylic acid binding protein 2 (SABP2), a potential mechanism of substrate discrimination for some promiscuous enzymes. *Biochemistry* **54**, 5366-5375 (2015). doi: 10.1021/acs.biochem.5b00638
57. **X. Yang***, J. Leebens-Mack, F. Chen, Y. Yin, Plant comparative and functional genomics. *International Journal of Genomics* **2015**, 924369 (2015). doi: 10.1155/2015/924369
56. **X. Yang***, J. C. Cushman, A. M. Borland, E. J. Edwards, S. D. Wulschleger, G. A. Tuskan, N. A. Owen, H. Griffiths, J. A. C. Smith, H. C. De Paoli, D. J. Weston, R. Cottingham, J. Hartwell, S. C. Davis, K. Silvera, R. Ming, K. Schlauch, P. Abraham, J. R. Stewart, H.-B. Guo, R. Albion, J. Ha, S. D. Lim, B. W. M. Wone, W. C. Yim, T. Garcia, J. A. Mayer, J. Peterreit, S. S. Nair, E. Casey, R. L. Hettich, J. Ceusters, P. Ranjan, K. J. Palla, H. Yin, C. Reyes-García, J. L. Andrade, L. Freschi, J. D. Beltrán, L. V. Dever, S. F. Boxall, J. Waller, J. Davies, P. Bupphada, N. Kadu, K. Winter, R. F. Sage, C. N. Aguilar, J. Schmutz, J. Jenkins, J. A. M. Holtum, A roadmap for research on crassulacean acid metabolism (CAM) to enhance sustainable food and bioenergy production in a hotter, drier world. *New Phytologist* **207**, 491-504 (2015). doi: 10.1111/nph.13393
55. R. Ming*, R. VanBuren, C. M. Wai, H. Tang, M. C. Schatz, J. E. Bowers, E. Lyons, M.-L. Wang, J. Chen, E. Biggers, J. Zhang, L. Huang, L. Zhang, W. Miao, J. Zhang, Z. Ye, C. Miao, Z. Lin, H. Wang, H. Zhou, W. C. Yim, H. D. Priest, C. Zheng, M. Woodhouse, P. P. Edger, R. Guyot, H.-B. Guo, H. Guo, G. Zheng, R. Singh, A. Sharma, X. Min, Y. Zheng, H. Lee, J. Gurtowski, F. J. Sedlazeck, A. Harkess, M. R. McKain, Z. Liao, J. Fang, J. Liu, X. Zhang, Q. Zhang, W. Hu, Y. Qin, K. Wang, L.-Y. Chen, N. Shirley, Y.-R. Lin, L.-Y. Liu, A. G. Hernandez, C. L. Wright, V. Bulone, G. A. Tuskan, K. Heath, F. Zee, P. H. Moore, R. Sunkar, J. H.

- Leebens-Mack, T. Mockler, J. L. Bennetzen, M. Freeling, D. Sankoff, A. H. Paterson, X. Zhu, **X. Yang**, J. A. C. Smith, J. C. Cushman, R. E. Paull*, Q. Yu*, The pineapple genome and the evolution of CAM photosynthesis. *Nature Genetics* **47**, 1435 (2015). doi: 10.1038/ng.3435
54. J. R. Mielenz*, M. Rodriguez, O. A. Thompson, **X. Yang**, H. Yin, Development of *Agave* as a dedicated biomass source: production of biofuels from whole plants. *Biotechnology for Biofuels* **8**, 79 (2015). doi: 10.1186/s13068-015-0261-8
53. L. Guo, J. Qiu, Z. Han, Z. Ye, C. Chen, C. Liu, X. Xin, C.-Y. Ye, Y.-Y. Wang, H. Xie, Y. Wang, J. Bao, S. Tang, J. Xu, Y. Gui, F. Fu, W. Wang, X. Zhang, Q. Zhu, X. Guang, C. Wang, H. Cui, D. Cai, S. Ge, G. A. Tuskan, **X. Yang**, Q. Qian, S. Y. He, J. Wang*, X.-P. Zhou*, L. Fan*, A host plant genome (*Zizania latifolia*) after a century-long endophyte infection. *The Plant Journal* **83**, 600-609 (2015). doi: 10.1111/tpj.12912
52. J. C. Cushman*, S. C. Davis, **X. Yang**, A. M. Borland, Development and use of bioenergy feedstocks for semi-arid and arid lands. *Journal of Experimental Botany* **66**, 4177-4193 (2015). doi: 10.1093/jxb/erv087
51. A. M. Borland, S. D. Wulfschleger, D. J. Weston, J. Hartwell, G. A. Tuskan, **X. Yang**, J. C. Cushman*, Climate-resilient agroforestry: physiological responses to climate change and engineering of crassulacean acid metabolism (CAM) as a mitigation strategy. *Plant, Cell & Environment* **38**, 1833-1849 (2015). doi: 10.1111/pce.12479
50. A. K. Biswal, Z. Hao, S. Pattathil, **X. Yang**, K. Winkeler, C. Collins, S. S. Mohanty, E. A. Richardson, I. Gelineo-Albersheim, K. Hunt, D. Ryno, R. W. Sykes, G. B. Turner, A. Ziebell, E. Gjersing, W. Lukowitz, M. F. Davis, S. R. Decker, M. G. Hahn, D. Mohnen*, Downregulation of *GAUT12* in *Populus deltoides* by RNA silencing results in reduced recalcitrance, increased growth and reduced xylan and pectin in a woody biofuel feedstock. *Biotechnology for Biofuels* **8**, 41 (2015). doi: 10.1186/s13068-015-0218-y
49. H. Yin, C. J. Chen, J. Yang, D. J. Weston, J.-G. Chen, W. Muchero, N. Ye, T. J. Tschaplinski, S. D. Wulfschleger, Z.-M. Cheng, G. A. Tuskan, **X. Yang***, Functional genomics of drought tolerance in bioenergy crops. *Critical Reviews in Plant Sciences* **33**, 205-224 (2014). doi: 10.1080/07352689.2014.870417
48. P. Szövényi*, N. Devos, D. J. Weston, **X. Yang**, Z. Hock, J. A. Shaw, K. K. Shimizu, S. F. McDaniel, A. Wagner, Efficient purging of deleterious mutations in plants with haploid selfing. *Genome Biology and Evolution* **6**, 1238-1252 (2014). doi: 10.1093/gbe/evu099
47. A. A. Myburg*, D. Grattapaglia, G. A. Tuskan, U. Hellsten, R. D. Hayes, J. Grimwood, J. Jenkins, E. Lindquist, H. Tice, D. Bauer, D. M. Goodstein, I. Dubchak, A. Poliakov, E. Mizrahi, A. R. K. Kullán, S. G. Hussey, D. Pinard, K. van der Merwe, P. Singh, I. van Jaarsveld, O. B. Silva-Junior, R. C. Togawa, M. R. Pappas, D. A. Faria, C. P. Sansaloni, C. D. Petrolí, **X. Yang**, P. Ranjan, T. J. Tschaplinski, C.-Y. Ye, T. Li, L. Sterck, K. Vanneste, F. Murat, M. Soler, H. S. Clemente, N. Saidi, H. Cassan-Wang, C. Dunand, C. A. Hefer, E. Bornberg-Bauer, A. R. Kersting, K. Vining, V. Amarasinghe, M. Ranik, S. Naithani, J. Elser, A. E. Boyd, A. Liston, J. W. Spatafora, P. Dharmwardhana, R. Raja, C. Sullivan, E. Romanel, M. Alves-Ferreira, C. Külheim, W. Foley, V. Carocha, J. Paiva, D. Kudrna, S. H. Brommonschenkel, G. Pasquali, M. Byrne, P. Rigault, J. Tibbits, A. Spokevicius, R. C. Jones, D. A. Steane, R. E. Vaillancourt, B. M. Potts, F. Joubert, K. Barry, G. J. Pappas, S. H. Strauss, P. Jaiswal, J. Grima-Pettenati, J. Salse, Y. Van de Peer, D. S. Rokhsar, J. Schmutz, The genome of *Eucalyptus grandis*. *Nature* **510**, 356 (2014). doi: 10.1038/nature13308
46. U. C. Kalluri*, H. Yin, **X. Yang**, B. H. Davison, Systems and synthetic biology approaches to alter plant cell walls and reduce biomass recalcitrance. *Plant Biotechnology Journal* **12**, 1207-1216 (2014). doi: 10.1111/pbi.12283

45. H. C. DePaoli, A. M. Borland, G. A. Tuskan, J. C. Cushman, **X. Yang***, Synthetic biology as it relates to CAM photosynthesis: challenges and opportunities. *Journal of Experimental Botany* **65**, 3381-3393 (2014). doi: 10.1093/jxb/eru038
44. A. M. Borland, J. Hartwell, D. J. Weston, K. A. Schlauch, T. J. Tschaplinski, G. A. Tuskan, **X. Yang**, J. C. Cushman*, Engineering crassulacean acid metabolism to improve water-use efficiency. *Trends in Plant Science* **19**, 327-338 (2014). doi: 10.1016/j.tplants.2014.01.006
43. C.-Y. Ye, **X. Yang**, X. Xia*, W. Yin*, Comparative analysis of cation/proton antiporter superfamily in plants. *Gene* **521**, 245-251 (2013). doi: 10.1016/j.gene.2013.03.104
42. C.-Y. Ye, T. Li, H. Yin, D. J. Weston, G. A. Tuskan, T. J. Tschaplinski, **X. Yang***, Evolutionary analyses of non-family genes in plants. *The Plant Journal* **73**, 788-797 (2013). doi: 10.1111/tpj.12073
41. S. Chen*, X. Huang, X. Yan, Y. Liang, Y. Wang, X. Li, X. Peng, X. Ma, L. Zhang, Y. Cai, T. Ma, L. Cheng, D. Qi, H. Zheng, **X. Yang**, X. Li*, G. Liu*, Transcriptome analysis in sheepgrass (*Leymus chinensis*): A dominant perennial grass of the Eurasian Steppe. *PLOS ONE* **8**, e67974 (2013). doi: 10.1371/journal.pone.0067974
40. A. M. Borland*, **X. Yang**, Informing the improvement and biodesign of crassulacean acid metabolism via system dynamics modelling. *New Phytologist* **200**, 946-949 (2013). doi: 10.1111/nph.12529
39. D. J. Weston*, D. A. Pelletier, J. L. Morrell-Falvey, T. J. Tschaplinski, S. S. Jawdy, T.-Y. Lu, S. M. Allen, S. J. Melton, M. Z. Martin, C. W. Schadt, A. A. Karve, J.-G. Chen, **X. Yang**, M. J. Doktycz, G. A. Tuskan, *Pseudomonas fluorescens* induces strain-dependent and strain-independent host plant responses in defense networks, primary metabolism, photosynthesis, and fitness. *Molecular Plant-Microbe Interactions* **25**, 765-778 (2012). doi: 10.1094/mpmi-09-11-0253
38. A. A. Karve*, S. S. Jawdy, L. E. Gunter, S. M. Allen, **X. Yang**, G. A. Tuskan, S. D. Wulfschleger, D. J. Weston, Initial characterization of shade avoidance response suggests functional diversity between *Populus* phytochrome B genes. *New Phytologist* **196**, 726-737 (2012). doi: 10.1111/j.1469-8137.2012.04288.x
37. J. L. Bennetzen*, J. Schmutz, H. Wang, R. Percifield, J. Hawkins, A. C. Pontaroli, M. Estep, L. Feng, J. N. Vaughn, J. Grimwood, J. Jenkins, K. Barry, E. Lindquist, U. Hellsten, S. Deshpande, X. Wang, X. Wu, T. Mitros, J. Triplett, **X. Yang**, C.-Y. Ye, M. Mauro-Herrera, L. Wang, P. Li, M. Sharma, R. Sharma, P. C. Ronald, O. Panaud, E. A. Kellogg, T. P. Brutnell, A. N. Doust, G. A. Tuskan, D. Rokhsar, K. M. Devos, Reference genome sequence of the model plant *Setaria*. *Nature Biotechnology* **30**, 555 (2012). doi: 10.1038/nbt.2196
36. C.-Y. Ye, T. Li, G. A. Tuskan, T. J. Tschaplinski, **X. Yang***, Comparative analysis of GT14/GT14-like gene family in *Arabidopsis*, *Oryza*, *Populus*, *Sorghum* and *Vitis*. *Plant Science* **181**, 688-695 (2011). doi: 10.1016/j.plantsci.2011.01.021
35. **X. Yang***, C.-Y. Ye, Z.-M. Cheng, T. J. Tschaplinski, S. D. Wulfschleger, W. Yin, X. Xia, G. A. Tuskan, Genomic aspects of research involving polyploid plants. *Plant Cell, Tissue and Organ Culture* **104**, 387-397 (2011). doi: 10.1007/s11240-010-9826-1
34. **X. Yang***, C.-Y. Ye, A. Bisaria, G. A. Tuskan, U. C. Kalluri*, Identification of candidate genes in *Arabidopsis* and *Populus* cell wall biosynthesis using text-mining, co-expression network analysis and comparative genomics. *Plant Science* **181**, 675-687 (2011). doi: 10.1016/j.plantsci.2011.01.020
33. **X. Yang***, T. J. Tschaplinski, G. B. Hurst, S. Jawdy, P. E. Abraham, P. K. Lankford, R. M. Adams, M. B. Shah, R. L. Hettich, E. Lindquist, U. C. Kalluri, L. E. Gunter, C. Pennacchio, G. A. Tuskan*, Discovery and annotation of small proteins using genomics, proteomics, and

- computational approaches. *Genome Research* **21**, 634-641 (2011). doi: 10.1101/gr.109280.110
32. **X. Yang***, T. Li, D. Weston, A. Karve, J. L. Labbe, L. E. Gunter, P. Sukumar, A. Borland, J.-G. Chen, S. D. Wulschleger, T. J. Tschaplinski, G. A. Tuskan, Innovative biological solutions to challenges in sustainable biofuels production. in *Biofuel Production-Recent Developments and Prospects*, M. A. D. S. Bernardes, Ed. (Intech, Rijeka, 2011), pp. 375-414. doi: 10.5772/17473
 31. **X. Yang**, C. M. Winter, X. Xia, S. Gang*, Genome-wide analysis of the intergenic regions in *Arabidopsis thaliana* suggests the existence of bidirectional promoters and genetic insulators. *Current Topics in Plant Biology* **12**, 15-33 (2011). doi:
 30. D. J. Weston*, A. A. Karve, L. E. Gunter, S. S. Jawdy, **X. Yang**, S. M. Allen, S. D. Wulschleger, Comparative physiology and transcriptional networks underlying the heat shock response in *Populus trichocarpa*, *Arabidopsis thaliana* and *Glycine max*. *Plant, Cell & Environment* **34**, 1488-1506 (2011). doi: 10.1111/j.1365-3040.2011.02347.x
 29. J. Guo, **X. Yang**, D. J. Weston, J.-G. Chen*, Absciscic acid receptors: Past, present and future. *Journal of Integrative Plant Biology* **53**, 469-479 (2011). doi: 10.1111/j.1744-7909.2011.01044.x
 28. J. Guo, Z. Jin, **X. Yang**, J.-F. Li, J.-G. Chen*, Eukaryotic initiation factor 6, an evolutionarily conserved regulator of ribosome biogenesis and protein translation. *Plant Signaling & Behavior* **6**, 766-771 (2011). doi: 10.4161/psb.6.5.15438
 27. S. P. DiFazio*, **X. Yang**, G. A. Tuskan, The *Populus* genome sequence. in *Genetics, Genomics and Breeding of Poplar*. (Science Publishers, Enfield, New Hampshire, 2011), pp. 85-111. doi: 10.1201/b10819
 26. B. Cai, **X. Yang**, G. A. Tuskan, Z.-M. Cheng*, MicroSyn: A user friendly tool for detection of microsynteny in a gene family. *BMC Bioinformatics* **12**, 79 (2011). doi: 10.1186/1471-2105-12-79
 25. L. Tyler, J. N. Bragg, J. Wu, **X. Yang**, G. A. Tuskan, J. P. Vogel*, Annotation and comparative analysis of the glycoside hydrolase genes in *Brachypodium distachyon*. *BMC Genomics* **11**, 600 (2010). doi: 10.1186/1471-2164-11-600
 24. The International Brachypodium Initiative, Genome sequencing and analysis of the model grass *Brachypodium distachyon*. *Nature* **463**, 763 (2010). doi: 10.1038/nature08747
 23. P. Ranjan*, T. Yin, X. Zhang, U. C. Kalluri, **X. Yang**, S. Jawdy, G. A. Tuskan, Bioinformatics-based identification of candidate genes from QTLs associated with cell wall traits in *Populus*. *BioEnergy Research* **3**, 172-182 (2010). doi: 10.1007/s12155-009-9060-z
 22. **X. Yang***, U. C. Kalluri, S. P. DiFazio, S. D. Wulschleger, T. J. Tschaplinski, M. Z.-M. Cheng, G. A. Tuskan, Poplar genomics: State of the science. *Critical Reviews in Plant Sciences* **28**, 285-308 (2009). doi: 10.1080/07352680903241014
 21. **X. Yang**, S. Jawdy, T. J. Tschaplinski, G. A. Tuskan*, Genome-wide identification of lineage-specific genes in *Arabidopsis*, *Oryza* and *Populus*. *Genomics* **93**, 473-480 (2009). doi: 10.1016/j.ygeno.2009.01.002
 20. Z. Xu, D. Zhang, J. Hu, X. Zhou, X. Ye, K. L. Reichel, N. R. Stewart, R. D. Syrenne, **X. Yang**, P. Gao, W. Shi, C. Doeppke, R. W. Sykes, J. N. Burris, J. J. Bozell, M. Z.-M. Cheng, D. G. Hayes, N. Labbe, M. Davis, C. N. Stewart, J. S. Yuan*, Comparative genome analysis of lignin biosynthesis gene families across the plant kingdom. *BMC Bioinformatics* **10**, S3 (2009). doi: 10.1186/1471-2105-10-S11-S3

19. L. D. Osburn*, **X. Yang**, Y. Li, Z.-M. Cheng, Micropropagation of Japanese honeysuckle (*Lonicera japonica*) and Amur honeysuckle (*L. maackii*) by shoot tip culture. *Journal of Environmental Horticulture* **27**, 195-199 (2009). doi: 10.24266/0738-2898-27.4.195
18. **X. Yang**, U. C. Kalluri, S. Jawdy, L. E. Gunter, T. Yin, T. J. Tschaplinski, D. J. Weston, P. Ranjan, G. A. Tuskan*, The F-Box gene family is expanded in herbaceous annual plants relative to woody perennial plants. *Plant Physiology* **148**, 1189-1200 (2008). doi: 10.1104/pp.108.121921
17. J. S. Yuan, **X. Yang**, J. Lai, H. Lin, Z.-M. Cheng, H. Nonogaki, F. Chen*, The endo- β -mannanase gene families in *Arabidopsis*, rice, and poplar. *Functional & Integrative Genomics* **7**, 1-16 (2007). doi: 10.1007/s10142-006-0034-3
16. **X. Yang***, B. E. Scheffler, L. A. Weston, Recent developments in primer design for DNA polymorphism and mRNA profiling in higher plants. *Plant Methods* **2**, 4 (2006). doi: 10.1186/1746-4811-2-4
15. **X. Yang**, G. A. Tuskan, Z.-M. Cheng*, Divergence of the Dof gene families in poplar, *Arabidopsis*, and rice suggests multiple modes of gene evolution after duplication. *Plant Physiology* **142**, 820-830 (2006). doi: 10.1104/pp.106.083642
14. **X. Yang***, T. G. Owens, B. E. Scheffler, L. A. Weston, Manipulation of root hair development and sorgoleone production in sorghum seedlings. *Journal of Chemical Ecology* **30**, 199-213 (2004). doi: 10.1023/B:JOEC.0000013191.35181.03
13. **X. Yang**, B. E. Scheffler, L. A. Weston*, *SOR1*, a gene associated with bioherbicide production in sorghum root hairs. *Journal of Experimental Botany* **55**, 2251-2259 (2004). doi: 10.1093/jxb/erh252
12. C. Bertin, **X. Yang**, L. A. Weston*, The role of root exudates and allelochemicals in the rhizosphere. *Plant and Soil* **256**, 67-83 (2003). doi: 10.1023/A:1026290508166
11. D. Mu*, **X. Yang**, Y. Zhang, The proportional fertilization in pot *Cordyline fruticosa* and *Rosa chinensis*. *Acta Horticulturae Sinica* **24**, 71-74 (1997). doi:
10. A. Hagiladi*, N. Umiel, **X. Yang**, *Curcuma alismatifolia*. II. Effects of temperature and daylength on the development of flowers and propagules. in *Flower Bulbs - Seventh International Symposium, Vols 1 and 2*, H. LilienKipnis, A. Borochoy, A. H. Halevy, Eds. (1997), pp. 755-761. doi:
9. A. Hagiladi*, N. Umiel, Z. Gilad, **X. Yang**, *Curcuma alismatifolia*. I. Plant morphology and the effect of tuberous root number on flowering date and yield of inflorescences. in *Flower Bulbs - Seventh International Symposium, Vols 1 and 2*, H. LilienKipnis, A. Borochoy, A. H. Halevy, Eds. (1997), pp. 747-753. doi:
8. **X. Yang***, B. Jin, Y. Zhang, D. Mu, X. Tang, Enhancement of direct shoot regeneration from internode segments of chrysanthemum by silver nitrate. *Acta Horticulturae* **404**, 68-73 (1995). doi:
7. B. Jin*, H. Dong, **X. Yang**, Shortening hybridization breeding cycle of rose - a study on mechanisms controlling achene dormancy. *Acta Horticulturae* **404**, 40-47 (1995). doi:
6. **X. Yang***, B. Jin, *The Camellias*. (China Agricultural Sciencetech Press, Beijing, 1994).
5. B. Jin*, H. Dong, **X. Yang**, Influence of gaseous environment and light on growth of tissue-cultured carnation plants. *Acta Horticulturae Sinica* **20**, 389-393 (1993). doi:
4. D. Mu*, B. Jin, **X. Yang**, Studies on the effect of IBA and nutrient- mist on the rooting of chrysanthemum cuttings. *Acta Horticulturae Sinica* **19**, 89-90 (1992). doi:
3. B. Jin*, H. Dong, D. Mu, **X. Yang**, Y. Wang, X. Xu, Studies on the mechanism of action of B9 in reducing stem elongation of chrysanthemum. *Acta Horticulturae Sinica* **19**, 171-174 (1992). doi:

2. **X. Yang**, W. Hu*, X. Sun, Changes in biomacromolecules in *Magnolia denudata* seed during dormancy breaking. *Acta Horticulturae Sinica* **18**, 75-80 (1991). doi:
1. **X. Yang**, W. Hu*, Studies on the removal of seed dormancy in *Magnolia denudata* Desr. *Journal of Chinese Landscape Architecture* **6**, 49-51 (1990). doi: