

TREVOR M. NOLAN

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EDUCATION

- Iowa State University** 2013 - 2018
Ph.D. in Genetics and Genomics
Plant Sciences Institute and Brown Graduate Fellow
- Iowa State University** 2009 - 2013
B.S. in Genetics
summa cum laude and Honors Program

RESEARCH EXPERIENCE

- Postdoctoral Researcher** July 2019-Ongoing
Laboratory of Philip Benfey, Duke University
- Postdoctoral Researcher** December 2018 - July 2019
Laboratory of Yanhai Yin, Iowa State University
Network Based Discovery of Brassinosteroid Regulation of Plant Growth and Stress Responses in Arabidopsis.
- Graduate Research Assistant** 2014 - 2018
Laboratory of Yanhai Yin, Iowa State University
To Grow or Survive: Plants Modulate Brassinosteroid-Regulated Transcription Factor BES1 During Drought to Mediate Growth-Stress Tradeoffs.
- Undergraduate Research Assistant** 2011-2013
Laboratory of Steven Rodermel, Iowa State University
Alternate Pathways of Electron Transport in the Plastid: Modulation of VTE1 in *immutans*.

PUBLICATIONS

23. Wang, P., N. Clark, **T. Nolan**, G. Song, P. Bartz, C. Liao, C. Montes-Serey, E. Katz, J. Polko, J. Kieber, D. Kliebenstein, D. Bassham, J. Walley, Y. Yin, and H. Guo 2022. Integrated omics reveal novel functions and underlying mechanisms of the receptor kinase FERONIA in Arabidopsis thaliana. *The Plant Cell*. <https://doi.org/10.1093/plcell/koac111>
22. Shahan, R., C. Hsu, **T. Nolan**, B. Cole, I. Taylor, L. Greenstreet, S. Zhang, A. Afanassiev, A. Hendrika C. Vlot, G. Schiebinger, P. Benfey, and U. Ohler 2022. A single-cell Arabidopsis root atlas reveals developmental trajectories in wild-type and cell identity mutants. *Developmental cell*. 57 (4), 543-560. e9 <https://doi.org/10.1016/j.devcel.2022.01.008>
21. Wang, P., **T. Nolan**, N. Clark, H. Jiang, C. Montes-Serey, H. Guo, D. Bassham, J. Walley, and Y. Yin. 2021. The F-box E3 ubiquitin ligase BAF1 mediates the degradation of the brassinosteroid-activated transcription factor BES1 through selective autophagy in Arabidopsis. *The Plant Cell*. 33 (11), 3532-3554 <https://doi.org/10.1093/plcell/koab210>
20. Shahan, R., **T. Nolan** and P. Benfey. 2021. Single-cell analysis of cell identity in the Arabidopsis root apical meristem: insights and opportunities. *Journal of experimental botany*. 72 (19), 6679-6686 <https://doi.org/10.1093/jxb/erab228>

19. Clark N., **T. Nolan**, P. Wang, G. Song, C. Montes, C. Valentine, H. Guo, R. Sozzani, Y. Yin, and J. Walley. 2021. Integrated omics networks reveal the temporal signaling events of brassinosteroid response in Arabidopsis. *Nature communications*. 12 (1), 1-13 <https://doi.org/10.1038/s41467-021-26165-3>
18. Xiang, L.*, **T. Nolan***, Y. Bao, M. Elmore, T. Tuel, J. Gai, D. Shah, P. Wang, N. Huser, A. Hurd, S. McLaughlin, S. Howell, J. Walley, Y. Yin, and L. Tang. 2021. Robotic Assay for Drought (RoAD): an automated phenotyping system for brassinosteroid and drought responses *The Plant Journal*. 107 (6), 1837-1853. <https://doi.org/10.1111/tpj.15401>
 - * co-first authors
17. **Nolan, T.**, N. Vukasinovic, D. Liu, J. Russinova and Y. Yin. 2020. Brassinosteroids: Multidimensional Regulators of Plant Growth, Development and Stress Responses. *Plant Cell*. 32 (2), 295-318. <https://doi.org/10.1105/tpc.19.00335>
16. Jiang, H., B. Tang, Z. Xie, **T. Nolan**, H. Ye, G. Song, J. Walley and Y. Yin. 2019. GSK3-Like Kinase BIN2 Phosphorylates RD26 to Potentiate Drought Signaling in Arabidopsis. *The Plant Journal*. <https://doi.org/10.1111/tpj.14484>
15. Xie, Z., **T. Nolan**, H. Jiang, B. Tang, M. Zhang, Z. Li and Y. Yin. 2019. The AP2/ERF Transcription Factor TINY Modulates Brassinosteroid-Regulated Plant Growth and Drought Response in Arabidopsis. *Plant Cell*. 31 (8), 1788-1806. <https://doi.org/10.1105/tpc.18.00918>
14. Wang, P., **T. Nolan**, Y. Yin and D. Bassham. 2019. Identification of a transcription factor-centered regulatory network of autophagy genes in Arabidopsis. *Autophagy*. 1-17. <https://doi.org/10.1080/15548627.2019.1598753>
13. Xie, Z., **T. Nolan**, H. Jiang and Y. Yin. 2019. AP2/ERF Transcription Factor Regulatory Networks in Hormone and Abiotic Stress Responses in Arabidopsis. *Frontiers in Plant Science*. 10, 228. <https://doi.org/10.3389/fpls.2019.00228>
12. Guo, H., **T. Nolan**, Z. Xie, G. Song, J. Walley and Y. Yin. 2018. FERONIA Receptor Kinase Contributes to Plant Immunity by Suppressing Jasmonic Acid Signaling in Arabidopsis thaliana. *Current Biology*. 28 (20), 3316-3324. <https://doi.org/10.1016/j.cub.2018.07.078>
11. **Nolan, T.**, J. Chen, and Y. Yin. 2017. Cross-talk of Brassinosteroid signaling in controlling growth and stress responses. *Biochemical Journal*. 474 (16), 2641-2661. <https://doi.org/10.1042/BCJ20160633>
10. Chen, J., **T. Nolan**, H. Ye, M. Zhang, H. Tong, P. Xin, J. Chu, C. Chu, Z. Li, and Y. Yin. 2017. Arabidopsis WRKY46, WRKY54 and WRKY70 Transcription Factors Are Involved in Brassinosteroid-Regulated Plant Growth and Drought Response. *Plant Cell*. 29 (6), 1425- 1439. <https://doi.org/10.1105/tpc.17.00364>
9. **Nolan, T.**, B. Brennan, M. Zhang, M. Yang, J. Chen, M. Zhang, Z. Li, X. Wang, D. Bassham, J. Walley, and Yin, Y. 2017. Selective Autophagy of BES1 Mediated by DSK2 Balances Plant Growth and Survival. *Developmental Cell*. 41 (1), 33-46. <https://doi.org/10.1016/j.devcel.2017.03.013>
 - Featured in *Science Signaling*, *BioTechniques*, *SciencDaily* and *Iowa Farmer Today*.
8. Yang, M., C. Li, Z. Cia, Y. Hu, **T. Nolan**, F. Yu, Y. Yin, Q. Xie, G. Tang and X. Wang. 2017. SINAT E3 ligases control the light-mediated stability of the brassinosteroid-activated transcription factor BES1 in Arabidopsis. *Developmental Cell*. 41 (1), 47-58. <https://doi.org/10.1016/j.devcel.2017.03.014>
7. Ye, H., S. Liu, B. Tang, J. Chen, Z. Xie, **T. Nolan**, H. Jiang, H. Guo, H. Lin, L. Li, Y. Wang, H. Tong, M. Zhang, C. Chu, Z. Li, M. Aluru, S. Aluru, P. Schnable and Y. Yin. 2017. RD26 mediates

- crosstalk between drought and Brassinosteroid signaling pathways. *Nature Communications*. 8, 14573. <https://doi.org/10.1038/ncomms14573>
6. Jiang, H., X. Want, **T. Nolan**, Y. Yin, M. Aluru and L. Dong. 2017. Automated microfluidic plant chips-based plant phenotyping system. *IEEE 12th International Conference on Nano/Micro Engineered and Molecular Systems (NEMS)*. 756-760. <https://doi.org/10.1109/NEMS.2017.8017129>
 5. **Nolan, T.**, H. Guo, S. Liu, L. Li, P. Schnable, and Y. Yin. 2016. Identification of Brassinosteroid Target Genes by Chromatin Immunoprecipitation Followed by High-throughput Sequencing (ChIP-seq) and RNA-seq. *Brassinosteroid Analysis Book*. https://doi.org/10.1007/978-1-4939-6813-8_7
 4. Pogorelko, G., S. Kambakam, **T. Nolan**, A. Foudree, O. Zabolina and S. Rodermel. 2016. Impaired Chloroplast Biogenesis in *immutans*, an Arabidopsis Variegation Mutant, Modifies Developmental Programming, Cell Wall Composition and Resistance to *Pseudomonas syringae*. *Plos one*. 11, 4. <https://dx.doi.org/10.1371/journal.pone.0150983>
 3. Wang, X., J. Chen, Z Xie, S Liu, **T. Nolan**, H. Ye, M. Zhang, H. Guo, P. Schnable, Z. Li, and Y. Yin. 2014. Histone Lysine Methyltransferase SDG8 Is Involved in Brassinosteroid-Regulated Gene Expression in Arabidopsis thaliana. *Molecular Plant* 7, 1303- 1315. <https://doi.org/10.1093/mp/ssu056>
 2. Putarjunan, A., X. Liu , **T. Nolan**, F. Yu , and S. Rodermel. 2013. Understanding chloroplast biogenesis using second-site suppressors of *immutans* and *var2*. *Photosynthesis Research* 116, 437-453. <https://doi.org/10.1007/s11120-013-9855-9>
 1. Foudree, A., A. Putarjunan, S. Kambakam, **T. Nolan**, J. Fussell, G. Pogorelko, and S. Rodermel. 2012. The Mechanism of Variegation in *immutans* Provides Insight into Chloroplast Biogenesis. *Frontiers in Plant Science* 3, 260. <https://doi.org/10.3389/fpls.2012.00260>

SELECTED TALKS

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| 25. VIB-UGent Center for Plant Systems Biology. Ghent, Belgium. | June 2nd, 2022. |
| 24. Mechanisms of Abiotic Stress Resilience and Applications for Agriculture. | May 22 - 27, 2022. |
| 23. Unraveling Plant Stress Responses Using Multidisciplinary Approaches. | May 21-22, 2022. |
| 22. CSHL Plant genomes, systems biology and engineering. | December 1-4, 2021. |
| 21. HHMI Cell and Developmental Biology meeting. | September 29th, 2021. |
| 20. Duke DCMB Seminar. | September 22nd, 2021. |
| 19. NSF PGRP Awardee Meeting. | September 10th, 2020. |
| 18. Plant Genomes in a Changing Environment. Virtual Conference. | October 12-14, 2020. |
| 17. Bioinformatics and Computational Biology Symposium. Iowa State University. | May 1st, 2020. |
| 16. Plant Genomes in a Changing Environment. Virtual Conference. | October 12-14, 2020. |
| 15. Climate Change-Linked Stress Tolerance in Plants. Hannover, Germany. | May 13-16, 2019. |
| 14. Centre for Research in Agricultural Genomics. Barcelona, Spain. | May 9th, 2019. |
| 13. Plant Sciences Institute Board Meeting. Ames, IA. | April 5, 2019. |
| 12. 3rd International Conference on Brassinosteroid Research. San Diego, CA. | August 1-4, 2018. |
| 11. Salk Institute for Biological Studies. San Diego, CA. | July 31st, 2018. |

10. Duke University. Durham, NC. July 26th, 2018.
9. Plant Biology 2018. Montreal, Quebec, Canada. July 14-18, 2018.
8. University of California San Diego. San Diego, CA. March 13th, 2018.
7. Workshop on Plant Development and Drought Stress. Pacific Grove, CA. November 5-8, 2017.
6. International Conference on Arabidopsis Research. St. Louis, MO. June 19-23, 2017.
5. Post-transcriptional Gene Regulation in Plants Meeting. Austin, TX. July 14-15, 2016.
4. Plant Biology 2016. Austin, TX. July 9-13, 2016.
3. GDCB Brown Bag Seminar Series. Ames, IA. November 11th, 2015.
2. International Conference on Arabidopsis Research. Paris, France. July 5-9, 2015.
1. Crop Bioengineering Consortium Summer 2015 Meeting. Ames, IA. June 17-18, 2015.

POSTER PRESENTATIONS

10. Plant Cell Atlas First PCA Symposium. December 8th, 2021.
9. Climate Change-Linked Stress Tolerance in Plants. Hannover, Germany. May 13-16, 2019.
8. Walter E and Helen Parke Loomis Lecture and Mini-Symposium. Ames, IA. May 6th, 2019.
7. Novel candidate gene discovery by computing on phenotypes. Ames, IA. April 3rd, 2019.
6. 1st International Plant Systems Biology Meeting. Roscoff, France. September 10-14, 2018.
5. Loomis and Crop Bioengineering Consortium 2018 Meeting. Ames, IA. May 8-10, 2018.
4. Predictive Crop Design: Genome-to-phenome. Lincoln, NE. April 6-7, 2017.
3. ASPB Midwest Section Meeting. Chicago State University, Chicago, IL. March 23-24th, 2013.
2. Plant Biology 2012. Austin, TX. July 20-24, 2012.
1. ASPB Midwest Section Meeting. University of Nebraska, Lincoln, NE. March 24-25, 2012.

TEACHING

Teaching Assistant <i>Genetics Laboratory (Genetics 313L)</i>	Spring 2018 Iowa State University
Guest Lecturer <i>Molecular Genetics (Genetics 409)</i>	Fall 2016 Iowa State University
Guest Lecturer <i>Transmission Genetics (Genetics 510)</i>	Spring 2016 Iowa State University
Tutor <i>Principles of Genetics (Genetics 313)</i>	Fall 2012 Iowa State University
Undergraduate Teaching Assistant <i>Principles of Genetics (Genetics 313 and 313L)</i>	Fall 2011 Iowa State University

MENTORING

Graduate Students

Tanner Cook	2018
Ashley Paulsen	2017
Basanta Bista	2017
Max McReynolds	2016
Jie Tang	2016

Undergraduate Lab Assistants

Ashley Hurd	2018-2019
Nicole Huser	2016-2019
Sean McLaughlin	2016-2019
Jessica Parrott	2016
Paige Rassel	2016
Kyle Small	2016
Ben Brennan	2014-2015

Technical Support Staff

Aiden Brosnan	2021-ongoing
Jingyuan Zhang	2020-ongoing
Megan Perkins-Jacobs	2019-2021

Mentor in Research Experience for Teachers Program

Nick Smith, Eagle Grove High School	2017-2018
Brent Chambers, Bellevue High School	2014

AWARDS AND FELLOWSHIPS

NSF National Plant Genome Initiative Postdoctoral Research Fellow <i>Duke University</i>	2020-2023
Plant Cell Atlas - Best Presentation <i>First PCA Symposium</i>	2021
Zaffarano Prize for Graduate Student Research <i>Iowa State University</i>	2019
Karas Award for an Outstanding Dissertation <i>Iowa State University</i>	2019
Genetics, Development and Cell Biology Award <i>Iowa State University</i>	2019
Genetics and Genomics Research Excellence Award <i>Iowa State University</i>	2018
Biochemical Journal Poster Award - 1st Place <i>3rd International Conference on Brassinosteroid Research, San Diego, CA</i>	2018
Best Poster Presentation by a Graduate Student <i>Loomis and Crop Bioengineering Consortium Meeting, Ames, IA</i>	2018
Brown Graduate Fellow <i>Iowa State University</i>	2016-2017

Plant Sciences Institute Fellow 2013-2017
Iowa State University

Travel Awards

GRC Salt and Water Stress in Plants Travel Grant 2022
Crop Bioengineering Center Travel Grant 2019
Iowa State University W.E. Loomis award for travel to Plant Biology 2018
Workshop on Plant Development and Drought Resistance 2017
Iowa State University W.E. Loomis award for travel to Plant Biology 2017
Iowa State University W.E. Loomis award for travel to Plant Biology 2016
Iowa State University GDCB travel award to the ICAR 2015

Best Oral Presentation by a Graduate Student 2016
Post-transcriptional Gene Regulation in Plants Meeting, Austin, TX

Best Poster Presentation by an Undergraduate Student 2013
ASPB Midwest Meeting, Chicago, IL

Research in Genetics Summer Undergraduate Internship 2012
Sui Tong Chan Fung Fund for the Promotion of Study, Iowa State University

GRANTS

Reconstructing spatial-temporal responses to drought in Arabidopsis and rice using time series single-cell transcriptomics 2020-2023
PI: Trevor M. Nolan

NSF National Plant Genome Initiative Postdoctoral Research Fellowship in Biology

Network-Based Discovery of Brassinosteroid Regulation of Plant Growth and Stress Responses in Arabidopsis 2018-2021
PI: Yanhai Yin Co-PI: Justin Walley

Role: Led the development and writing of this funded proposal from the NSF Division of Molecular and Cellular Biosciences Cellular Dynamics and Function cluster.

Crosstalk between Brassinosteroid and autophagy pathways in the regulation of plant growth and stress responses 2017-2020
PI: Yanhai Yin Co-PIs: Diane Bassham and Justin Walley

Role: Generated preliminary data, participated in writing and designed experimental approach for this funded NIH R01 proposal.

PROFESSIONAL ACTIVITIES

Sigma Xi Scientific Research Society 2019

Graduate Student Representative 2017
Genetics, Development and Cell Biology Faculty Search Committee

Iowa State University Crop Bioengineering Center Member 2014-2019

American Society of Plant Biologists Member 2012-Present

Ad Hoc Reviewer

Independent manuscript reviews

Plant Cell

2018, 2020, 2021

Planta

2019

Mentored reviews under Dr. Yanhai Yin

New Phytologist, PNAS, Developmental Cell, Plant Biotechnology Journal

2016-2018

REFERENCES

Dr. Philip Benfey, Professor

Duke University

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Dr. Yanhai Yin, Professor

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Dr. Diane Bassham, Professor

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Dr. Justin Walley, Assistant Professor

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