Gunvant Patil

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EDUCATION:

2003	B.S.	Botany	North Maharashtra University, Jalgaon, MS, India
2005	M.S.	Botany	University of Pune, Pune, MS, India
2010	Ph.D.	Plant Biotechnology	University of Pune, and National Research Center on Plant Biotechnology, New Delhi, India

PROFESSIONAL EXPERIENCE:

2010 - 2012	Visiting Researcher, Swedish University of Agricultural Sciences, Uppsala, Sweden
2012 - 2017	Postdoctoral Associate, University of Missouri, MO, USA
2017 - 2020	Researcher 6, University of Minnesota, MN, USA
2020 – Present	Assistant Professor, Texas Tech University, TX, USA

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

2017 - Present	American Society of Plant Biologist (ASPB)
2021 - Present	American Phytopathological Society (APS)
2020 - Present	The Crop Science Society of America (CSSA)
2020 -Present	The Society of In Vitro Biology (SIVB)

HONORS AND AWARDS:

2024 Global Exchange Research Seed Award, TTU International Affairs

2023 International Award for Environmental Botany, Eurasian Academy of Environmental Sciences (EAES).

2022 Texas Tech University – Faculty Travel Award

2018 Center for Genome Engineering travel award, University of Minnesota

2016 Certificate of Recognition and research award from Director of Interdisciplinary Plant Group, University of Missouri

AREA OF EXPERTISE

Plant molecular biology, genetic engineering, plant tissue culture, genomics

RESEARCH INTERESTS

Plant Molecular Biology, Seed composition, Gene-editing, Nutrition uptake, Disease resistance, Plant Physiology, Functional Genomics

PATENTS: total of 2 (1 at Texas Tech University)

Patil G, Herrera-Estrella L, Ojha A (2023) Method for developing *de novo* transgenic and gene-edited shoots without tissue culture. D2024-0010 Disclosure submitted for Provisional Patent.

Zhang F, Stupar R, **Patil GB** (2020) A method for plant transformation and genome modification of legume species. United States Patent Application - 09531-0440001

PUBLICATIONS:

 # - Publication by Student or Postdoc, * - Corresponding author

Books: total of 0
Book Chapters: total of 4
Books and Book Chapters Edited: total of 3

Refereed Book Chapters: total of 4 (Total at Texas Tech University 2)

1. Anderson EJ, Ali ML, [..] **Patil GB**. et al. (2019) Soybean [Glycine max (L.) Merr.] Breeding: History, Improvement, Production and Future Opportunities. In Advances in Plant Breeding Strategies: Legumes (pp. 431-516) Springer, Cham.
2. Chaudhary, J, Shivaraj, S.M, Khatri, P, Ye, H, Zhou, L, Klepadlo, M, Dhakate, P, Kumawat, G, **Patil, G,** Sonah, H. and Ratnaparkhe, M, (2019) Approaches, Applicability, and Challenges for Development of Climate-Smart Soybean. In *Genomic Designing of Climate-Smart Oilseed Crops* (pp. 1-74) Springer, Cham.
3. Bhardwaj S, Devkar V#, Kumar A, Alisha, Sharma S, Deshmukh R, **Patil GB*** (2022) Advances and Applicability of Genotyping Technologies in Cotton Improvement. In Genotyping by Sequencing for Crop Improvement. Ed. Sonah H. Wiley.
4. **Patil GB***, Stupar RM, Zhang F (2022) Protoplast isolation, transfection and gene editing for soybean (Glycine max). In Protoplast Technology. Ed. Kan Wang. Springer Nature

Refereed Journals: total published 55 (Total at Texas Tech University 25)

1. **Patil G**, Patel R, Jaat R, Pattanayak A, Jain P, Srinivasan R. (2009) Glutamine improves shoot morphogenesis in chickpea (*C. arietinum*) *Acta Physiologiae Plantarum*. 1;31(5):1077-84.

2. **Patil G**, Deokar A, Jain PK, Thengane RJ and Srinivasan R (2009) Development of a phosphomannose isomerase-based Agrobacterium-mediated transformation system for chickpea (Cicer arietinum L.) *Plant Cell Reports*, *28*(11), pp.1669-1676.
3. **Patil G,** Nicander B (2013) Identification of two additional members of the tRNA isopentenyltransferase family in *Physcomitrella* patens. *Plant Molecular Biology*. 1;82(4-5):417-26.
4. Deshmukh R, Sonah H, **Patil G**, Chen W, Prince S, Mutava R, Vuong T, Valliyodan B and Nguyen HT (2014) Integrating omic approaches for abiotic stress tolerance in soybean. *Frontiers in Plant science*, *5*, p.244.
5. **Patil G,** Valliyodan B, Deshmukh R, Prince S, Nicander B, Zhao M, Sonah H, Song L, Lin L, Chaudhary J, Liu Y, Nguyen H (2015) Soybean (Glycine max) SWEET gene family: insights through comparative genomics, transcriptome profiling and whole genome re-sequence analysis. *BMC Genomics*, *16*(1), p.520.
6. Chen W, He S, Liu D, **Patil GB**, Zhai H, Wang F, Stephenson TJ, Wang Y, Wang B, Valliyodan B and Nguyen HT (2015) A sweetpotato geranylgeranyl pyrophosphate synthase gene, IbGGPS, increases carotenoid content and enhances osmotic stress tolerance in Arabidopsis thaliana. *PLoS One*, *10*(9)
7. Prince SJ, Joshi T, Mutava RN, Syed N, Vitor, M, **Patil G,** Song L, Chen W, Shannon JG, Nguyen H (2015) Comparative analysis of the drought-responsive transcriptome in soybean lines contrasting for canopy wilting. *Plant Science*, *240*, pp.65-78.
8. Chaudhary, **Patil GB,** Sonah H, Deshmukh RK, Vuong TD, Valliyodan B and Nguyen HT (2015) Expanding omics resources for improvement of soybean seed composition traits. *Frontiers in Plant Science*, *6*, p.1021.
9. Syed N, Prince S, Mutava R, **Patil G*,** Li S, Chen W, Babu V, Joshi T, Khan S and Nguyen H, (2015) Core clock, SUB1, and ABAR genes mediate flooding and drought responses via alternative splicing in soybean. *Journal of Experimental Botany*, *66*(22), pp.7129-7149.
10. Prince SJ, Song L, Qiu D, dos Santos J, Chai C, Joshi T, **Patil G,** Valliyodan B, Vuong TD, Murphy M and Krampis K (2015) Genetic variants in root architecture-related genes in a Glycine soja accession, a potential resource to improve cultivated soybean. *BMC genomics*, *16*(1), p.132.
11. Sonah H, Chavan S, Katara J, Chaudhary J, Kadam S, **Patil G** and Deshmukh R (2016) Genome-wide identification and characterization of Xylanase Inhibitor Protein (XIP) genes in cereals. *Indian J. Genet. Plant Breed*, *76*, pp.159-166.
12. Asekova S, Kulkarni K, **Patil G,** Kim M, Song J, Nguyen HT, Shannon J and Lee J (2016) Genetic analysis of shoot fresh weight in a cross of wild (G. soja) and cultivated (G. max) soybean. *Molecular Breeding*, *36*(7), p.103.
13. Song L, Nguyen N, Deshmukh R, **Patil GB**, Prince S, Valliyodan B, Mutava R, Pike S, Gassmann W and Nguyen H, (2016) Soybean TIP gene family analysis and characterization of GmTIP1; 5 and GmTIP2; 5 water transport activity. *Frontiers in plant science*, *7*, p.1564.
14. Kadam S, Vuong, T.D, Qiu, D, Meinhardt, C.G, Song, L, Deshmukh, R, **Patil, G,** Wan, J, Valliyodan, B, Scaboo, A.M. and Shannon, J.G, (2016) Genomic-assisted phylogenetic analysis and marker development for next generation soybean cyst nematode resistance breeding. *Plant Science*, *242*, pp.342-350.

15. Chen, W, Yao, Q, **Patil, G**.**B***, Agarwal, G, Deshmukh, R.K, Lin, L, Wang, B, Wang, Y, Prince, S.J, Song, L. and Xu, D, (2016) Identification and comparative analysis of differential gene expression in soybean leaf tissue under drought and flooding stress revealed by RNA-Seq. *Frontiers in plant science*, *7*, p.1044.
16. **Patil, G,** Do, T, Vuong, T.D, Valliyodan, B, Lee, J.D, Chaudhary, J, Shannon, J.G. and Nguyen, H.T, (2016) Genomic-assisted haplotype analysis and the development of high-throughput SNP markers for salinity tolerance in soybean. *Scientific Reports*, *6*(1), 1-13.
17. Valliyodan, B, Qiu, D, **Patil, G***, Zeng, P, Huang, J, Dai, L, Chen, C, Li, Y, Joshi, T, Song, L. and Vuong, T.D, (2016) Landscape of genomic diversity and trait discovery in soybean. *Scientific reports*, *6*, p.23598.
18. Cheng, P, Gedling, C.R, **Patil, G,** Vuong, T.D, Shannon, J.G, Dorrance, A.E. and Nguyen, H.T, (2017) Genetic mapping and haplotype analysis of a locus for quantitative resistance to Fusarium graminearum in soybean accession PI 567516C. *Theoretical and applied genetics*, *130*(5), pp.999-1010.
19. **Patil, G,** Chaudhary, J, Vuong, T.D, Jenkins, B, Qiu, D, Kadam, S, Shannon, G.J. and Nguyen, H.T, (2017) Development of SNP genotyping assays for seed composition traits in soybean. *International journal of plant genomics*
20. **Patil, G,** Mian, R, Vuong, T, Pantalone, V, Song, Q, Chen, P, Shannon, G.J, Carter, T.C. and Nguyen, H.T, (2017) Molecular mapping and genomics of soybean seed protein: a review and perspective for the future. *Theoretical and Applied Genetics*, *130*(10), pp.1975-1991.
21. Klepadlo, M, Meinhardt, C.G, Vuong, T.D, **Patil, G,** Bachleda, N, Ye, H, Robbins, R.T, Li, Z, Shannon, J.G, Chen, P. and Meksem, K, (2018) Evaluation of soybean germplasm for resistance to multiple nematode species: Heterodera glycines, Meloidogyne incognita, and R reniformis. *Crop Science*, *58*(6), pp.2511-2522.
22. Kulkarni, K.P, **Patil, G*,** Valliyodan, B, Vuong, T.D, Shannon, J.G, Nguyen, H.T. and Lee, J.D, (2018) Comparative genome analysis to identify SNPs associated with high oleic acid and elevated protein content in soybean. *Genome*, *61*(3), pp.217-222.
23. **Patil, G,** Vuong, T.D, Kale, S, Valliyodan, B, Deshmukh, R, Zhu, C, Wu, X, Bai, Y, Yungbluth, D, Lu, F. and Kumpatla, S, (2018) Dissecting genomic hotspots underlying seed protein, oil, and sucrose content in an interspecific mapping population of soybean using high-density linkage mapping. *Plant Biotechnology Journal*, *16*(11), pp.1939-1953.
24. Do, T.D, Vuong, T.D, Dunn, D, Smothers, S, **Patil, G,** Yungbluth, D.C, Chen, P, Scaboo, A, Xu, D, Carter, T.E. and Nguyen, H.T, (2018) Mapping and confirmation of loci for salt tolerance in a novel soybean germplasm, Fiskeby III. *Theoretical and applied genetics*, *131*(3), pp.513-524.
25. Do, T.D, Vuong, T.D, Dunn, D, Clubb, M, Valliyodan, B, **Patil, G,** Chen, P, Xu, D, Nguyen, H.T. and Shannon, J.G, (2019) Identification of new loci for salt tolerance in soybean by high-resolution genome-wide association mapping. *BMC Genomics*, *20*(1).
26. **Patil, G,** Lakhssassi, N, Wan, J, Song, L, Zhou, Z, Klepadlo, M, Vuong, T.D, Stec, A.O, Kahil, S.S, Colantonio, V. and Valliyodan, B, (2019) Whole-genome re-sequencing reveals the impact of the interaction of copy number variants of the rhg1 and Rhg4 genes on broad-based resistance to soybean cyst nematode. *Plant Biotechnology Journal*, *17*(8), pp.1595-1611.

27. Valliyodan, B, Cannon, [..] Patil **G,** et al. (2019) Construction and comparison of three reference-quality genome assemblies for soybean. *The Plant Journal*, *100*(5), 1066-1082.
28. Vishwakarma, K, Mishra, M, **Patil, G,** Mulkey, S, Ramawat, N, Pratap Singh, V, Deshmukh, R, Kumar Tripathi, D, Nguyen, H.T. and Sharma, S, (2019) Avenues of the membrane transport system in adaptation of plants to abiotic stresses. *Critical Reviews in Biotechnology*, *39*(7), pp.861-883.
29. Vats, S, Kumawat, S, Kumar, V, **Patil, G.B,** Joshi, T, Sonah, H, Sharma, T.R. and Deshmukh, R, (2019) Genome Editing in Plants: Exploration of Technological Advancements and Challenges. *Cells*, *8*(11), p.1386.
30. Lakhssassi, N, **Patil, G*,** Piya, S, Zhou, Z, Baharlouei, A, Kassem, M.A, Lightfoot, D.A, Hewezi, T, Barakat, A, Nguyen, H.T. and Meksem, K, (2019) Genome reorganization of the GmSHMT gene family in soybean showed a lack of functional redundancy in resistance to soybean cyst nematode. *Scientific Reports*, *9*(1), pp.1-16.
31. Kumar N, Kumawat S, Khatri P, Singla P, Tandon G, Bhatt V, **Patil GB**, Sonah H, Deshmukh R (2020) Understanding aquaporin transport system in highly stress-tolerant and medicinal plant species Jujube (*Ziziphus jujuba* Mill.). *Journal of Biotechnology*. 20; 324:103-11.
32. Usovsky M, Ye H, Vuong TD, **Patil GB**, Wan J, Zhou L, Nguyen HT (2020). Fine-mapping and characterization of qSCN18, a novel QTL controlling soybean cyst nematode resistance in PI 567516C. *Theoretical and Applied Genetics*.
33. Graham N, **Patil GB**, Bubeck D, Dobert R, Glenn K, Gutsche A, Kumar S, Lindbo J, Maas L, May G, Vega-Sanchez M, Stupar R, Morrell P (2020) Genome editing in dynamic genetic background: the relevance of "Off-Target" edits in plants ***Plant Physiology***. doi.org/10.1104/pp.19.01194 ***(One of the top 3 articles in 2020 &2021 in Plant Physiology).***
34. Lakhssassi N, Zhou Z, Liu S, Piya S, Cullen MA, El Baze A, Knizia D, **Patil GB**, Badad O, Embaby MG, Meksem J (2020) Soybean TILLING-by-sequencing+ reveals the role of novel GmSACPD members in the unsaturated fatty acid biosynthesis while maintaining healthy nodule. *Journal of Experimental Botany* doi.org/10.1093/jxb/eraa402
35. Agarwal G, Kudapa H, Ramalingam A, Choudhary D, Sinha P, Garg V, Singh VK, **Patil GB**, Pandey MK, Nguyen HT, Guo B (2020) Epigenetics and epigenomics: underlying mechanisms, relevance, and implications in crop improvement. *Functional & Integrative Genomics*. 20, 739–761.
36. Usovsky M, Lakhssassi N, **Patil GB**, Vuong TD, Piya S, Hewezi T, Robbins RT, Stupar RM, Meksem K, Nguyen HT (2021) Dissecting nematode resistance regions in soybean revealed pleiotropic effect of soybean cyst and reniform nematode resistance genes. *The Plant Genome*. 16:e20083.
37. Bayer PE, Valliyodan B, Hu H, Marsh JI, Yuan Y, Vuong TD, **Patil GB**, Song Q, Batley J, Varshney RK, Lam HM, Nguyen HT (2021) Sequencing the USDA core soybean collection reveals gene loss during domestication and breeding. *The Plant Genome*. e20109. doi.org/10.1002/tpg2.20109
38. Usovsky M, Ye H, Vuong TD, **Patil GB**, Wan J, Zhou L, Nguyen HT (2021) Fine-mapping and characterization of qSCN18, a novel QTL controlling soybean cyst nematode resistance in PI 567516C. *Theoretical and Applied Genetics* 134(2):621-31.

39. Valliyodan B, Brown AV, Wang J, **Patil GB***, Liu Y, Otyama PI, Nelson RT, Vuong T, Song Q, Musket TA, Wagner R (2021) Genetic variation among 481 diverse soybean accessions, inferred from genomic re-sequencing. *Scientific Data*. 8;8(1):1-9. [Equal Contributing Author]
40. Thakral V, Bhat JA, Kumar N, Myaka B, Sudhakaran S, **Patil GB**, Sonah H, Shivaraj SM, Deshmukh R (2021) Role of silicon under contrasting biotic and abiotic stress conditions provides benefits for climate smart cropping. *Environmental and Experimental Botany*. 9:104545 doi.org/10.1016/j.envexpbot.2021.104545
41. Deshmukh R, Rana N, Liu Y, Zeng S, Agarwal G, Sonah H, Varshney R, Joshi T, **Patil GB***, Nguyen HT (2021) Soybean transporter database: A comprehensive database for identification and exploration of natural variants in soybean transporter genes. *Physiologia Plantarum*. 171(4):756-70.
42. Vuong TD, Sonah H, **Patil GB**, Meinhardt C, Usovsky M, Kim KS, Belzile F, Li Z, Robbins R, Shannon JG, Nguyen HT (2021) Identification of genomic loci conferring broad-spectrum resistance to multiple nematode species in exotic soybean accession PI 567,305. *Theoretical and Applied Genetics* 23:1-7.
43. Nitnaware KM, Raskar KB, Agarwal G, Chávez Montes R#, Chopra R, Arredondo DL, Nikam TD, **Patil GB***. (2021) Whole-genome characterization and comparative genomics of a novel freshwater cyanobacteria species: *Pseudanabaena punensis. Molecular Phylogenetics and Evolution. https://*doi.org/10.1016/j.ympev.2021.107272
44. Rana N, Kumawat S, Kumar V, Bansal R, Mandlik R, Dhiman P#, **Patil GB**, Deshmukh R, Sharma T, Sonah H (2022) Deciphering Haplotypic Variation and Gene Expression Dynamics Associated with Nutritional and Cooking Quality in Rice. *Cells 11(7), 1144; https://doi.org/10.3390/cells11071144*
45. Vats S, Kumar V, Mandlik R, **Patil G**, Sonah H, Roy J, Sharma TR, Deshmukh R (2023) Reference Guided De Novo Genome Assembly of Transformation Pliable *S. lycopersicum* cv. Pusa Ruby. *Genes* 14(3) https://doi.org/10.3390/genes14030570
46. Vats S, Shivaraj SM, Sonah H, **Patil G,** Roy J, Sharma TR, Deshmukh R (2023). Efficient Regeneration and Agrobacterium-Mediated Transformation Method for Cultivated and Wild Tomato. *Plant Molecular Biology Reporter* 7:1-2. https://doi.org/10.1007/s11105-023-01374-w
47. D'Agostino LW #, Yong-Villalobos L #, Herrera-Estrella L, **Patil GB*** (2023) Development of High-Quality Nuclei Isolation to Study Plant Root–Microbe Interaction for Single-Nuclei Transcriptomic Sequencing in Soybean. *Plants* 2023 12(13):2466. https://doi.org/10.3390/plants12132466
48. Ojha A#, Zhang F, **Patil GB*** (2023) Genome editing and chromosome engineering in plants. *The Plant Genome*. (2): e20352. https://doi.org/10.1002/tpg2.20352
49. Thakral V, Sharma Y, Mandlik R, **Patil G,** Sonah H, Isenring P, Bélanger R, Sharma R, Deshmukh R (2023) Identification of VrNIP2-1 aquaporin with novel selective filter regulating the transport of beneficial as well as hazardous metalloids in mungbean. *Plant Physiology and Biochemistry https://doi.org/10.1016/j.plaphy.2023.108057*
50. Saini DK, Impa SM, McCallister D, **Patil GB**, Abidi N, Ritchie G, Jaconis SY, Jagadish KS (2023) High day and night temperatures impact on cotton yield and quality - current status and future research direction. *J Cotton Res.* 6(1):1-7.

51. Nwoko L[#], Ojha AK[#], Devkar V[#], **Patil GB*** (2023) An Improved Method for Protoplast Isolation and Gene-Editing from Soybean Root, Callus and Transgenic Hairy-Roots. *J Plant Biol Crop Res.*; 6(2): 1088.
52. Dhingra A[#], Dagostino L[#], Devkar V[#], Shinde H, Rajurkar A, Sonah H, Vuong T, Siebecker M, Jiao Y, Hancock N, Nguyen H, Deshmukh R, **Patil GB*** (2024) Identification of Novel Germplasm and Genetic Loci for Enhancing Mineral Element Uptake in Soybean. *Environmental and Experimental Botany.* *https://doi.org/10.1016/j.envexpbot.2023.105643*
53. Devkar V[#], Dagostino L[#], Kshetry AO[#], Yong L[#], Nadaf AB, Thirumlaikumar VP, Skirycz A, Ma J, Stupar R, Herrera Estrella L, Deshmukh R, **Patil GB***. Identification of cell-type-specific response to silicon treatment in soybean leaves through single nucleus RNA-sequencing. bioRxiv. 2024:2024-04.
54. Phogat S, Lankireddy S, Lekkala S, Anche V, Sripathi, Patil G, Puppala N, Janga M (2024) Progress in Genetic Engineering and Genome Editing of Peanuts: Revealing the Future of Crop Improvement. *Physiology and Molecular Biology of Plants* *https://doi.org/10.1007/s12298-024-01534-6*
55. Nigam D, Devkar V[#], Dhiman P[#], Shakoor S, Liu D, **Patil GB***, Jiao Y (2025) Emerging frontiers in sorghum genetic engineering. *The Plant Journal* doi: 10.1111/tpj.17244

Abstracts: total of 10 (Total at Texas Tech University 3) Note: Published abstracts were also presented at scientific meetings.

 # - Publication by Student or Postdoc, * - Corresponding author

1. **Patil G**, Kumar V, Sharma P, Deokar A, Srinivasan R (2010) Promoter Element of an ERF Gene of Arabidopsis Drives Trichome-Specific Expression and Retains Its Specificity in Brassica juncea. In Vitro Plant Biology Meeting, St Louis, MO
2. **Patil GB** (2014) Identification of sequence variants in candidate genes for Oil content using whole genome Re-sequencing of soybean germplasm. Plant and Animal Genome XXVI, San Diego
3. Vuong T, **Patil GB**, Nguyen H (2018) Genetic Association Analysis and Genomic Prediction of Soluble Carbohydrates in Soybeans. Plant and Animal Genome XXVI, San Diego, CA
4. **Patil GB,** Deshmukh R, Stupar R (2018) Understanding Silicon uptake in soybean using Gene-editing technology. Soy2018 Conference, Athens, GA.
5. Mulkey S, **Patil GB**, Roessler J, Stec A, Belzile F, Hyten D, Stupar R (2019) Development of an ENU and EMS Induced Mutant Resource for Functional Genomics in Soybean. Plant and Animal Genome XXVII, San Diego, CA
6. Zhang F, **Patil GB** (2019) Improving HDR-mediated Genome Editing Through Plant Protoplast Engineering. In Vitro Plant Biology Meeting, Tampa, FL
7. Nwoko L[#], Devkar V[#], Ojha A[#], **Patil GB*** (2022) Protoplast engineering in soybean. In Vitro Plant Biology Meeting, San Diego, CA

8. Ojha A[#], Devkar V[#], Estrella L[#], **Patil GB*** (2022) Development of tissue culture-free genetic transformation and gene-editing platform in crops. In Vitro Plant Biology Meeting, San Diego, CA
9. D'Agostino L[#], Estrella L and **Patil GB*** (2022) Understanding the Dynamics of Soybean Root Nodule Development Using Single Cell Transcriptome Technology. In Vitro Plant Biology Meeting, San Diego, CA
10. Pallavi[#], Jiao Y, **Patil GB* (2022)** Deciphering the dynamics of sugarcane aphid (SCA) resistance in sorghum. USDA-ARS & TTU Research Spotlight.

Invited Abstracts (2):

1. **Patil GB** (2016) Soybean Transporter Database. Plant and Animal Genome, San Diego, CA
2. **Patil GB,** Vuong T, Nguyen H (2017) Development of high-throughput markers for salinity tolerance in soybeans. World Soybean Conference, Columbus, OH

Technical Reports: total of 0

Other Publications or Media: total of 4

1. **NEWS:** Scientists develop additional soybean reference genomes. https://www.feedstuffs.com/print/28224
2. **NEWS:** Soybean genome unmasked https://phys.org/news/2018-03-soybean-genomes-unmasked.html
3. **NEWS:** The Miracle Bean Scientists develop additional soybean reference genomes https://cafnr.missouri.edu/2018/02/the-miracle-bean/
4. **Data release:** High-Quality Genome Assemblies for G. max cultivar 'Lee' and G. soja accession PI 483463 https://soybase.org/projects/SoyBase.B2018.01.php
5. **Research highlighted** in Soybean Sentinel Magazine https://www.flipsnack.com/5AFAEEF569B/fall-2022-kentucky-soybean-sentinel.html

PRESENTATIONS AND LECTURES: total of 8 (Total 5 at Texas Tech University) Those listed below are invited seminar presentations.

1. January 15, 2016. Soybean Transporter Database. Plant and Animal Genome, San Diego, CA
2. August 12-16, 2017. Development of high-throughput markers for salinity tolerance in soybean. World Soybean Conference, Columbus, OH
3. January 13, 2019. Whole Genome Re-Sequencing Reveals the Impact of Copy Number Variants of the Rhg4 Gene on Broad-Based Resistance to Soybean Cyst Nematode. Plant and Animal Genome, San Diego, CA
4. June 30, 2020. Genome Editing technology to improve disease resistance in soybeans. Kosambi Lecture Series, University of Pune, India
5. November 27, 2020. Gene Editing Platform in soybean. Interdisciplinary Plant Group, University of Missouri, MO.

6. June 25, 2021. Discovery of novel regulatory elements and copy number variation for SCN resistance. Plant Breeding Today, The Pune Knowledge Cluster, India
7. June 19, 2023. Understanding the nutrient uptake and its potential role in water deficit conditions in soybean. World Soybean Research Conference. Vienna, Austria.
8. August 12, 2023. Editing for abiotic stress outcomes in soybean. SOY2023 International Conference. Lincoln, NE, USA.
9. Jan 12, 2024. Single nucleus RNAseq and gene-editing reveals cell-specific regulation of mineral nutrient uptake in soybean. Plant and Animal Genome, San Diego, CA, July 16, 2024.

GRADUATE STUDENT COMMITTEES:

Completed: 2
In Progress: 6
Chaired: total of 5, Co-chaired: 1, Committee Member: 5

M.S.: 1

1. **Lois Chidinma Nwoko, M.S.** (September 2021 – July 2023). Title of thesis: Development of novel methods for protoplast regeneration in soybeans.

Ph.D.: 4

1. **Arjun Ojha, Ph.D.** (September 2020 – Dec. 2024). Thesis Title: Understanding and development of novel pathways involved in stem cell activity and de novo shoot regeneration in plants.
2. **Leonidas Dagostino, M.S.** (September 2021 – Present). Title of thesis: Understanding the dynamics of nodule development in soybean using single cell technology.
3. **Pallavi Dhiman, Ph.D.** (May 2022 – Present). Title of thesis: Investigating the molecular mechanism of sugar cane aphid resistance in sorghum.
4. **Micayla Lamb, M.S.** (January 2023 – Present)

Co-Chaired: total of 1

1. **Zhiyuan Liu, Ph.D.** (September 2021 – Present)

Committee member: total of 5 (completed 1):

1. Pranav Dawar (Ph. D.) Completed: Biological Sciences, Texas Tech University
2. Mezanur Rahman (Ph. D.) Ongoing: Institute of Genomics for Crop Abiotic Stress Tolerance, Plant and Soil Science.
3. Sanjida Keya (Ph. D.) Ongoing: Institute of Genomics for Crop Abiotic Stress Tolerance, Plant and Soil Science.
4. Matteo Tosoni (Ph.D.) Ongoing: Institute of Genomics for Crop Abiotic Stress Tolerance, Plant and Soil Science.

5. Adil Khan (Ph.D.) Ongoing: Institute of Genomics for Crop Abiotic Stress Tolerance, Plant and Soil Science.

UNDERGRADUATE STUDENT ADVISING: 7

1. Lee Fischer (Jan 2023 – Current)
2. Johnathan Salter (Fall 2022 – May 2024)
3. Gourav Patil (Fall 2022 – May 2024)
4. Rangoli Dhatrak (Fall 2022 – March 2024)
5. Varun Kharde (Spring 2022 – Summer 2022)
6. Bharath Poreddy (Spring 2022 – Summer 2022)
7. Kensington Fansler (Fall 2022 – Summer 2023)

UNDERGRADUATE STUDENT RESEARCH ADVISING: 2

1. Jessica Kennedy (Mar 2022 – April 2024) Dept. of Biochemistry, Texas Tech University through Center for the Integration of STEM Education and Research (CISER).
2. Vaishnavi Deshmukh (Jan 2023 – Jan 2024) Biological Sciences, Integrated Biotechnology Program, Texas Tech University

HIGHSCHOOL STUDENT INTERN

1. Arpan Ojha – Summer 2024

POST-DOCTORAL ASSOCIATES SUPERVISED: Total 9

1. Arjun Ojha, Genome Engineering, Dec. 2024 - Present
2. Vikas Devkar, Genome engineering. October 2020 – Present
3. Kaushik Ghose, Genome engineering, January 2022 – Present
4. Gaurav Raturi, Molecular Biology, May 2023 – Present
5. Ramkumar TR, Molecular Biology, April 2024 – Present
6. Wuzi Xie, Plant Tissue Culture, Aug 2024 - Present
7. Mallesham Bulle, Plant tissue culture, Oct. 2022 – Dec. 2024
8. Anuradha Dhingra, Computational Biology, Jan 2022 – Sept 2023
9. Dolores Gutierrez, Genome engineering. January 2021 – Oct 2022

INTERNATIONAL VISITNG STUDENT, POSTDOC ADVISING: Total 3

1. **Durgeshwari Gadpayale** (Ph.D. Student) Department of Biochemistry, Indian Agriculture Research Institute, New Delhi, India. *Program: National Agriculture Higher Education Project funded by World Bank.*
2. **Rashmi Deo** (Postdoc), Savitribai Phule Pune University, India
3. **Subha Lakshmi Manoharan**, Indo-US Science and Technology Forum (IUSSTF).

TEACHING RESPONSIBILITIES:

1. PSS 1321: Agronomic Plant Science (3 credits; 80% responsibility) - Fall 2021

2. PSS 5325: Transgenic and Plant Cell Genetics (3 credits; 100% responsibility) - Spring each year.

Other Teaching Responsibilities:

2020

1. PSS 7000, Research. Total 2 students

2021

1. PSS 6000, Master's Thesis. Total 2 students.
2. PSS 7000, Research. Total 3 students

2022

1. PSS 6000, Master's Thesis. Total 2 students.
2. PSS 7000, Research. Total 5 students

2023

3. PSS 6000, Master's Thesis. Total 2 students.
4. PSS 7000, Research. Total 5 students

2024

5. PSS 6000, Master's Thesis. Total 1 students.
6. PSS 7000, Research. Total 5 students

GRANTS AND AWARDS:

Funded Projects:

Total funded as PI or Co-PI: **$7,433,960 (7.43 M)**
My share: **$2,881,814 (2.88 M)**

#	Year	Title	Funding Agency	Role	Total Funding	My Share
1	**2020, 2021, 2022**	Next Generation Soybeans with Durable Resistance to multiple SCN Races through Genome Engineering of Rhg4 (Completed)	United Soybean Board	PI: Henry Nguyen, **Co-PI: Gunvant Patil,** Khalid Meksem	$615,000	$144,000
2	**2021, 2022, 2023**	Development of a cotton mutant population as a source of traits for cotton improvement	Texas State Support Committee	PI: Lopez-Arredondo; **Co-PI: Gunvant Patil,** Herrera-Estrella	$64,378	$21,450
3	**2021-2025**	Development of a robust regeneration and transformation system in cotton	Project Revolution BASF	**PI: Gunvant Patil;** Co-PI: Lorenzo Aleman	$571,184	$427,184

4	**2021, 2022, 2023**	Technologies to improve nutrient uptake and reduce excess fertilizer use in soybean	Southern Soybean Board	**PI: Gunvant Patil**	$97,493	$97,493
5	**2021-2023**	Genetic Transformation and gene editing for grain legumes (Completed)	USDA-AFRI	PI: Feng Zhang, **Co-PI: Gunvant Patil,** Robert Stupar	$299,500	$129,999
6	**2021-2023**	Tissue-culture independent gene editing of shoot apical meristem cells by a long-distance RNA transport system (Completed)	USDA-AFRI	PI: Herrera-Estrella; **Co-PI: Gunvant Patil,** Lopez-Arredondo	$144,000	$28,000
7	**2021, 2022, 2023, 2024**	Gene editing and innovative mutation breeding approaches to develop 2nd generation improved soybean soluble carbohydrate composition	FFAR -USB (Foundation for Food & Agri. Research)	**PI: Gunvant Patil;** Co-PI: Khalid Meksem, Henry Nguyen	$1,084,395	$344,423
8	**2021**	Development and Releases of High Tocopherol Soybean Germplasm (Completed)	United Soybean Board	PI: Khalid Meksem; Co-PI: **Gunvant Patil,** Henry Nguyen	$187,000	$33,000
9	**2022**	Gene editing to improve soybean yield component traits (Completed)	United Soybean Board	PI: Feng Zhang; **Co-PI: Gunvant Patil,** Robert Stupar	$150,000	$62,000
10	**2022-2024**	Preliminary phase to evaluate the feasibility of developing centromere-mediated haploid inducer lines by use of CENH3 technology in G. hirsutum and G. max.	Project Revolution (BASF)	**PI: Gunvant Patil;** Co-PI: Lorenzo Aleman	$415,487	$311,439
11	**2022, 2023, 2024**	Redefining the effects of beneficial microorganisms on N fixation and nutrient uptake in soybean to provide sustainable solutions to reduce chemical fertilizers use	United Soybean Board	**PI: Gunvant Patil;** Co-PI: Luis Herrera Estrella, Henry Nguyen	$688,337	$376,098
12	**2022, 2023**	Optimizing root system architecture of cotton cultivars for improving adaptive response to water-deficit stress	Texas State Support Committee	**PI: Gunvant Patil;** Co-PI: Lopez-Arredondo, Krishna Jagadish, Sanjit Deb	$56,000	$16,500
13	**2023**	Field phenotyping using machine learning tools integrated with genetic mapping to address heat and drought induced flower abortion in soybean	Multi Regional Soy Checkoff	PI: Krishna Jagadish, **Co-PI: Gunvant Patil,** Henry Nguyen, William Schapaugh, Doina Caragea, Avat Shekoofa, Glen Ritchie, Impa Somayanda	$800,156	$100,000
14	**2023**	An integrated research program to accelerate sorghum breeding and management for improving weed control, abiotic stress tolerance and grain quality.	Sorghum Checkoff	PI: Herrera-Estrella; **Co-PI: Gunvant Patil,** Lopez-Arredondo, Son Tran, Yinping Jiao	$1,000,000	$150,000
15	**2023, 2024**	Unraveling the role of novel GmNAC42 gene in SCN and fungal disease resistance	United Soybean Board	PI: **Gunvant Patil** Co-PI: Vikas Devkar	$146,048	$146,048
16	**2023**	Sustainable production of climate smart CO2 responsive cotton equipped with enhanced root biomass and carbon sequestration	Project Revolution (BASF)	PI: Krishna Jagadish, **Co-PI: Gunvant Patil**, Aron Norris, Glen Ritchie, Impa Somayanda	$266,597	$53,319
17	**2024-2027**	Molecular Mechanism of a Novel Transcriptional Regulator for Broad Based Resistance to Soybean Cyst Nematode	USDA-AFRI	PI: Henry Nguyen, **Co-PI: Gunvant Patil**	$749,985	$362,461

18	**2024-2025**	Doubling the grain yield potential of sorghum by targeting MSD3 gene using gene-editing technology	USDA-TTU	**PI: Gunvant Patil;** Co-PI Zhanguo Xin	$98,400	$78,400
				Total	**$7,433,960**	**$2,881,814**

Declined Projects

Declined					
2020	Exploration of the beneficial role of silicon uptake for disease resistance and fiber quality improvement in cotton	Texas State Support Committee	**PI: Gunvant Patil** Co-PI: Damar Lopez-Arredondo	$28,000	$28,000
2020	Application of genome-editing technologies to understand the role of genes and regulatory elements involved in soybean cyst nematode resistance	USDA-AFRI	**PI: Gunvant Patil**	$490,959	$230,000
2020	Signaling molecule-based strategies for enhancing heat tolerance in elite wheat accessions	FFAR	PI: Son Tran **Co-PI: Gunvant Patil**	$522,122	$251,060
2022	Resource Allocation of Nitrogen-Fixing Species in a Changing Climate	National Science Foundation	PI: Hydee Laza **Co-PI: Gunvant Patil**	$847,784	$225,000
2023	Elucidating molecular mechanism of a novel transcriptional regulator for broad based resistance to soybean cyst nematode	USDA-NIFA	PI: Henry Nguyen **Co-PI: Gunvant Patil**	$750,000	$362,451

Funding/Scholarship to students or lab members (Total $63,400)

Year	Title	Funding Agency	Role	Total Funding
2022 - 2025	Understanding the molecular mechanism of Sugarcane Aphids Resistance in Sorghum	TTU Distinguish Graduate Student Assistant	**Advisor: Gunvant Patil,** Yinping Jiao Student: Pallavi	$37,500
2023-2024	Root system architecture in cotton germplasm	USDA- Sustainable Ag. Research and Education (SARE) & Davis College, TTU	**Advisor: Gunvant Patil** Student: Micayla Lamb	$16,900
2022	Effect of metabolites on beneficial microorganisms in soybean root.	Davis College, TTU	**Advisor: Gunvant Patil** Student: Jessica Kennedy	$2,000
2022-2023	Tissue culture free gene-editing in crops	Helen DeVitt Jones Graduate Fellowship	**Advisor: Gunvant Patil** Student: Arjun Ojha	$10,000
			Total	**$63,400**

SERVICE TO PROFESSIONAL ORGANIZATIONS

SERVICE TO:

UNIVERSITY:

1. Conference Grant Proposal Reviewer, TTU Undergraduate Research. (March 30, 2021).
2. Grant Proposal Reviewer, TTU Undergraduate Research. (March 1, 2022 - March 4, 2022).
3. Committee member of the Institutional Biosafety Committee (IBC), Texas Tech University (August 2023 – Present).
4. Member of STEM Center for Outreach, Research & Education (STEM CORE).
5. Dean's representative for Ph.D. thesis (till date: 2).

COLLEGE (college of Agricultural Sciences and Natural Resources - CASNR):

1. Proposal reviewer for Davis College Catalyst Program (two proposals FY2024).

DEPARTMENT (Plant and Soil Sciences, PSS):

1. Committee Member, Strategic Planning. (January 2021 – May 2021).
2. Recruitment Activity. Assistant/Associate Professor 28388BR - Assistant/Associate Professor on Cell Biology (Open Rank) IGCAST, Pending (March 15, 2022 - Current).
3. Committee Member: Outstanding Graduate Student Award
4. Judge: PSS Student Symposium (April 2024).
5. Department International Committee (Since Oct. 2024)
6. PSS Teaching Plan development committee (Since Nov. 2024)

COMMUNITY:

1. **Member:** Crop Science Distinguished Award Committee, CSSA.
2. **Committee Member**- Graduate School Workshop Committee for Tri-Society (ACS) (2024 – 2025)
3. **Communication Chair:** Post-doctoral Association, University of Missouri, MO (June 2015 – Oct 2016).
4. **Student Project Judge,** National Future Farmers of America (FFA) Organization at University of Minnesota, MN (2018)
5. **Judge**, South Plains Regional Science and Engineering School Competition, Lubbock, TX. (February 7, 2020).

NATIONAL AND INTERNATIONAL SCIENTIFIC COMMUNITY:

1. **Travel Grant Judge,** American Phytopathological Society (APS), October 2019 - Present.
2. **Ph.D. Thesis evaluator:** Effect of culture media, plant growth regulators and genotypes on the in vitro regeneration of oil palm (Elaeis guineensis Jacq.). KL University, India

3. **Ph.D. Thesis evaluator:** Bioprospecting of bioactive compounds from P. concanensis and H. grande, Savitribai Phule Pune University, India
4. **Book Proposal Evaluation:** Book Title: CRISPRized Horticulture Crops, ELSEVIER
5. Reviewer for **USDA-Southern SARE** Graduate Student Grants (6 proposals).

OTHER PROFESSIONAL SERVICE:

Reviewer for Federal Research Funding Agencies:

1. Reviewer for **USDA-National Program** (NP-301C; Panel 12a) Oilseeds Genetic Improvement (2022 – 2023); reviewed two proposals.

2. Ad-hoc reviewer for **National Science Foundation (NSF)** Plant Genome Research Program (PGRP) Sept. 2023; reviewed one proposal.

3. Reviewer international proposal: **The Czech Science Foundation** Aug. 2024.

4. Reviewed two proposals for **NSF Small Business Innovation Research** (NSF-SBIR)– Aug. 2024

5. Reviewed best-published papers in the CSSA's Crop Science journal for C01 division (Crop Breeding and Genetics) award.

Edited and Reviewed manuscripts for scientific journals:

Associate Editor: The Plant Genome (CSSA)
Academic Editor: Frontiers in Plant Science. (August 15, 2021 - Present).
PLOS One. (August 2020 - Present).
Scientific Reports. (May 2020 - Present).
Molecular Biology Reports (July 2024 – present).
Guest Editor: The Plant Genome. (March 1, 2021 - August 15, 2022).
International Journal of Plant Genomics (March 2018 – October 2018)
Scientific reports (March 2024 – Dec. 2024).

Reviewed 87+ and edited 23 research articles for various peer-reviewed journal including: Genes Genomes Genetics, Physiologia Plantarum, Plant Cell Reports, Genome Biology, Plant Cell Reports, Scientific Reports, Frontiers in Plant Sciences, Physiology and Molecular Biology of Plants, PLOS Genetics, PLoS One, Plant Biotechnology Journal.

OUTREACH AND EXTENSION

Showcase of soybean research project "technologies to improve nutrient uptake and reduce fertilizer use" at New Deal Farm and IGCAST. A panel of Directors, members, and farmers of the Southern Soybean Research Program visited in Summer 2022.

CONSULTING ACTIVITIES: N/A