

Zhike Deng

Email: zhike.deng.maize@gmail.com Phone: +86 17780156421

Address: No. 61 Yuquan Road, Qingquan Community, Anzhou District, Mianyang, Sichuan Province, China, 621000

EDUCATION

Sichuan Agricultural University

09/2022-06/2026

Bachelor's Degree in Seed Science and Engineering

Average Score: 86/100

Relevant Modules:

Biochemistry (92); Molecular Biology (90); Cell Biology (90); Precise Crop Phenomics (90); Field Experiment and Statistical Analysis (87); Experiment of Field Experiment and Statistical Analysis (98); Experiment of Microbiology (96); Experiment of Seed Biology Seed (94); Experiment of Plant Physiology (91); Experiment of Genetics (90); Experiment of Molecular Biology (89); Experiment of Botany (88).

PUBLICATIONS

1. Dai, W[†]., **Deng, Z[†]**, Ma, L. & Shen, Y^{*}. (2025) Genetic Basis of Starch Content and *ZmSSIIIb-1*-driven Molecular Network Construction of Starch Biosynthesis in Maize Kernels. *The Plant Journal*. [**Co-first author**, In submission]
2. He, Y[†]., **Deng, Z[†]**., He, S., Qi, Z., Chang, H., Liu, P., Chen, Z., Zou, C., Shen, Y^{*}., & Ma, L^{*}. (2025). Trait-associated Co-expression Network Reveals the Regulatory Mechanism of Cell Wall Components in Maize Stalk. *BMC Genomics*. [**Co-first author**, Accepted]
3. Zhang, M[†]., Zhang, Y[†]., **Deng, Z.**, Liu, T., Liang, Y., Li, Q., Zou, C., Chen, Z., Ma, L. & Shen, Y^{*}. (2025). GWAS and Gene Co-expression Network Analysis Reveal the Genetic Control of Seed Germination under Salt Stress in Maize. *Theoretical and Applied Genetics*. [Resubmitted the revised version and under review for Science Citation Index Journal]
4. He, S., Zhang, X., Chang, H., Tian, X., **Deng, Z.**, Chen, Z., Zou, C., Yuan, G., Ma, L., & Shen, Y^{*}. (2025). Genetic Dissection of Oil Content in Maize Kernel Using Combined Genome-Wide Association Analysis and Linkage Mapping. *Theoretical and Applied Genetics*. [In submission]

PATENTS

1. **Deng, Z.**, Dai, W., Zou, C., Ma, L., & Shen, Y. (2025). CN119709779A - A Gene called *ZmSSIIIb-1* for Regulating Total Starch Content in Maize and Its dCAPS Molecular Marker.
2. Ma, L, Shen, Y., **Deng, Z.**, & Yuan, G. (2025). CN119979566A - A *ZmCPS5* Gene Related to Chlorophyll Content in Corn Leaves and Its SNP Molecular Marker and Application.

PROJECTS

1. **National Key Research and Development Program of China:** Genetic Basis of Starch Content and Molecular Network Construction of Starch Biosynthesis in Maize Kernels.
2. **Key Program of the National Natural Science Foundation of China:** Regulation Mechanism of Maize Lodging Resistance.
3. **Key Program of the National Natural Science Foundation of China:** Genetic Mechanism of Maize Kernel Development.

PROFESSIONAL EXPERIENCES

Researcher, State Key Laboratory of Crop Gene Exploration and Utilization in Southwest China, Maize Research Institute, Sichuan Agricultural University.

2022-2025

1. *ZmSSIIIb-1*-driven Molecular Network Construction of Starch Biosynthesis and Functional Applications of Starch Accumulation in Maize Kernels.

Core Researcher | Advisor: **Prof. Yaou Shen** (Vice Director, Maize Research Institute, S.A.U)

2022-2025

- Identified natural allelic variations in *ZmSSIIIb-1* strongly correlated with starch content by candidate gene association analysis, thereby partitioning *ZmSSIIIb-1* into two haplotypes.
- Characterised enzymatic activity differences between these haplotypes, thereby validating the phenotypic data from a functional perspective and confirming the utility of this variation.
- Developed functional molecular markers based on this variation for targeted breeding applications.
- Utilising high-starch maize as a donor, developed elite high-starch inbred lines through MAS and backcross breeding.
- Screened and identified downstream interacting partners of protein *ZmSSIIIb-1*.
- Discovered and validated upstream regulatory factors like TFs that impact *ZmSSIIIb-1*'s expression.
- Dissected upstream regulatory and downstream molecular mechanisms to elucidate how *ZmSSIIIb-1* modulates starch

biosynthesis.

- Integrated these findings to construct a molecular network underlying starch formation in maize kernels.
- Drafted the manuscript for the research article as co-first author.

2. Regulatory Mechanism of Maize Stalk Cell Wall Composition.

Core Researcher | Advisor: **Prof. Yaou Shen and Assoc. Prof. Langlang Ma**

2023-2025

- Cultivated extreme-phenotype maize inbred lines (cellulose/hemicellulose/lignin) and conducted tissue sampling for RNA-seq.
- Performed high-quality RNA extraction according to the manual of FastPure Cell/Tissue Total RNA Isolation Kit (Vazyme, Nanjing, China).
- Analysed RNA-seq data to identify differentially expressed genes (DEGs) associated with cell wall biosynthesis.
- Conducted WGCNA to construct co-expression networks, revealing 2 key modules correlated with lignocellulose traits.
- Managed phenotyping of 100 inbred lines for cell wall component quantification.
- Conducted candidate gene association analysis by integrating phenotypic data (cellulose, hemicellulose, lignin) with genotypic data from the 100 inbred lines, followed by haplotype classification.
- Cultivation and phenotyping of 100 maize inbred lines for association analysis.
- Performed RT-qPCR-based tissue-specific expression profiling of key candidate gene across multiple maize tissues.

3. Genetic Control of Maize Seed Germination under Salt Stress

Researcher | Advisor: **Prof. Yaou Shen**

2022-2023

- Participated in measuring phenotypic data (germination rate, root length, shoot length) of 300 maize inbred lines under salt treatment.
- Conducted association analysis of hub gene identified by GWAS to mine natural variations closely related to salt stress.
- Determined the subcellular localisation of the hub candidate gene (*ZmKCH5*) through transient expression assays in *Nicotiana benthamiana*.
- Verified *ZmKCH5* function via *Agrobacterium*-mediated *Arabidopsis* transformation, demonstrating its role in salt stress tolerance through comparative phenotypic analysis.
- Verified phenotypes of *zmkch5* mutants in maize, validating its essential role in maize salt stress response.

EXTRACURRICULAR ACTIVITIES

Core Member, 'Volunteer Activities for the Country People' Summer Social Practice

07/2023

- Conducted field trips to various counties in Sichuan to promote soybean and corn belt composite planting technology, which demonstrated increased productivity with stable corn yield and additional soybean harvest, resulting in a per-acre income increase of over 300 RMB in 2020 and approximately 400 RMB in 2021.
- Investigated local planting conditions, collaborated with farmers to develop tailored solutions, and managed to optimise planting density and spacing referring to regional ecological and climate conditions.
- Contributed to the widespread adoption of the technology, supported by national policy initiatives, and recognised for sustainable agricultural practices.
- Wrote the news release on the Sichuan Culture Website: <http://www.scgoo.cn/article-30990-1.html>
- Awarded Provincial-level Outstanding Team of Sichuan Province and Outstanding Individual in Social Service.

Member, Winter Social Practice

02/2023

- Conducted interviews with people of various ages about their perceptions of different periods of the Red Age.
- Organised and analysed all interview data to compile a comprehensive formal report.

ADDITIONAL INFORMATION

Languages: Chinese (native), English.

Technical Skills: molecular biology techniques including PCR, vector construction, Western Blotting (WB), subcellular localization, Protein prokaryotic expression (Induction and purification), sterile techniques, DNA-pulldown, Yeast two-hybrid, Yeast one-hybrid, GST-pulldown, Split-LUC, BiFC, Dual-luciferase transient expression, Electrophoretic Mobility Shift Assay (EMSA), etc.

Software: SnapGene (molecular biology tool), Tassel 5 (GWAS and Candidate gene association analysis software model), R Studio, Microsoft Office Suite, etc.

Personal Qualities: Firm belief in the positive societal impact of research; strong empathy to understand and support partners; durable persistence and self-motivation to overcome academic challenges; unique creativity and imagination to propose solutions.