

**Zhi-Yan (Rock) Du**  
**College of Tropical Agriculture and Human Resources**  
**Department of Molecular Biosciences & BioEngineering**  
 FTE Distribution: 40% I; 60% R; 0% E

**Education**

<u>Degree</u>	<u>University</u>	<u>Major</u>
Bachelors	Beijing Forestry University	Biological Sciences
Masters	Institute of Botany, Chinese Academy of Sciences	Evolutionary Developmental Biology
PhD	The University of Hong Kong	Biochemistry & Molecular Biology

**Professional Appointments**

<u>Title</u>	<u>Employer</u>	<u>Dates Employed</u>
Assistant Professor (tenure-track)	Department of Molecular Biosciences & BioEngineering, UHM	2020.8 - present
Assistant Professor (fixed-term)	Department of Biochemistry & Molecular Biology, Michigan State University	2018-2020
Research Associate	US Department of Energy-MSU Plant Research Laboratory, Michigan State University	2013 - 2018
Research Assistant	Plant Molecular Biology and Biochemistry, School of Biological Sciences, The University of Hong Kong	2011 - 2013

**Courses Taught**

Course ID and name (credits)

MBBE/BIOL 401 Molecular Biotechnology (3 cr) in spring each year  
 MBBE/BIOL 401L Molecular Biotechnology Lab - Gene Editing by CRISPR (2 cr, starts in spring 2022)

**Publications (reverse chronological order)**

Books

Du, Z., Hoffmann-Benning, S., Zienkiewicz, A., Zienkiewicz, K., Wang, S., Yin, L. Lipid Metabolism in Development and Environmental Stress Tolerance for Engineering Agronomic Traits. Frontiers Media SA. 2021.

Book Chapters

1. Zhu, S., Bonito, G., Chen, Y., and **Du, Z.\*** 2020. Oleaginous Fungi in Biorefineries. In "Reference

Module in Life Sciences” (ISBN 9780128096338), DOI: 10.1016/B978-0-12-819990-9.00004-4.

2. **Du, Z.**, and Benning, C. 2016. Triacylglycerol accumulation in photosynthetic cells in plants and algae. In “Lipids in plant and algae development” (ISBN 9783319259796), edited by Nakamura, Y. and Li-Beisson Y. Springer. 179-205.

### **Selected Journal Publications**

1. Du, Z., Hoffmann-Benning, S., Zienkiewicz, A., Zienkiewicz, K., Wang, S., Yin, L. 2021. Editorial: Lipid Metabolism in Development and Environmental Stress Tolerance for Engineering Agronomic Traits. *Frontiers in Plant Science*, DOI: 10.3389/fpls.2021.739786.
2. Shi, M., **Du, Z.**, Hua, Q., and Kai, G. 2021. CRISPR/Cas9-mediated targeted mutagenesis of bZIP2 in *Salvia miltiorrhiza* leads to promoted phenolic acid biosynthesis. *Industrial Crops and Products* 164: 113560.
3. Zhou, W., Li, S., Maoz, I., Wang, Q., Xu, M., Feng, Y., Hao, X., **Du, Z.\***, and Kai G. 2021. SmJRB1 positively regulates the accumulation of phenolic acid in *Salvia miltiorrhiza*. *Industrial Crops and Products* 164: 113417.
4. Guo, Z., Pogancev, G., Meng, W., **Du, Z.**, Liao, P., Zhang, R., Chye, M. 2020. The overexpression of rice ACYL-COA-BINDING PROTEIN4 improves salinity tolerance in transgenic rice. *Environmental and Experimental Botany*, 104349.
5. Meng, W., Xu, L., **Du, Z.**, Wang, F., Zhang, R., Song, X., Lam, S., Shui, G., Li, Y., and Chye, M. 2020. RICE ACYL-COA-BINDING PROTEIN6 affects acyl-CoA homeostasis and growth in rice. *Rice*, 13: 75.
6. Aznar-Moreno, J., Venegas-Calderón, M., **Du, Z.**, Garcés, R., Tanner, J., and Chye, M., Martínez-Force, E., Salas, J. 2020. Characterization and function of a sunflower (*Helianthus annuus* L.) Class II acyl-CoA-binding protein. *Plant Science*, 300: 110630.
7. Liber, J., Bryson, A., Bonito, G., and **Du, Z.\*** 2020. Harvesting Microalgae for Food and Energy Products. *Small Methods*, 2000349.
8. Zienkiewicz, A., Zienkiewicz, K., Poliner, E., Pulman, J., **Du, Z.**, et al. 2020. The microalga *Nannochloropsis* during transition from quiescence to autotrophy in response to nitrogen availability. *Plant Physiology*, 182:819-839.
9. **Du, Z.**, Zienkiewicz, K., Vande Pol, N., Ostrom, N., Benning, C., and Bonito, C. Algal-fungal symbiosis leads to a photosynthetic mycelium. *eLife*, 2019;8:e47815.
10. O'Donnell, D., **Du, Z.**, Litchman, E. 2019. Experimental evolution of phytoplankton fatty acid thermal reaction norms. *Evolutionary Applications*, <https://doi.org/10.1111/eva.12798>.
11. **Du, Z.**, Alvaro, J., Hyden, B., Zienkiewicz, K., Benning, N., Zienkiewicz, A., Bonito, C., and Benning, C. 2018. Enhancing oil production and harvest by combining the marine alga *Nannochloropsis oceanica* and the oleaginous fungus *Mortierella elongata*. *Biotechnology for Biofuels*, 11: 174.
12. Poliner, E., Takeuchi, T., **Du, Z.**, Benning, C., Farré, E. 2018. Non-transgenic marker-free gene disruption by an episomal CRISPR system in the oleaginous microalga, *Nannochloropsis oceanica* CCMP1779. *ACS Synthetic Biology*, 7: 962-968.
13. **Du, Z.**, Lucker, B., Zienkiewicz, K., Millera, T., Zienkiewicz, A., Sears, B., Kramer, D., and Benning, C. 2018. Galactoglycerolipid Lipase PGD1 Is Involved in Thylakoid Membrane Remodeling in Response to Adverse Environmental Conditions in *Chlamydomonas*. *The Plant Cell*, 30: 447-465.
14. Zienkiewicz, K., Zienkiewicz, A., Poliner, E., **Du, Z.**, Vollheyde, K., Herrfurth, C., Marmon, S., Farré, E., Feussner, I., and Benning, C. 2017. *Nannochloropsis*, a rich source of diacylglycerol acyltransferases for engineering of triacylglycerol content in different hosts. *Biotechnology for Biofuels*, 10: 8.
15. Uehling, J., Gryganskyi, A., Hameed, K., Tschaplinski, T., Misztal, P., Wu, S., Desirò, A., Vande Pol, N., **Du, Z.** et al. 2017. Comparative genomics of *Mortierella elongata* and its bacterial endosymbiont

*Mycoavidus cysteinexigens*. *Environmental Microbiology*, 19: 2964-2983.

16. Zienkiewicz, K., **Du, Z.**, Ma W., and Benning, C. 2016. Neutral lipid biosynthesis in microalgae - molecular, cellular and physiological insight. *Biochimica et Biophysica Acta*, 1816: 1269-1281.
17. **Du, Z.**, Arias, T., Meng, W., and Chye, M. 2016. Plant acyl-CoA-binding proteins: An emerging family involved in plant development and stress responses. *Progress in Lipid Research*, 63: 165-181.
18. **Du, Z.**, Chen, M., Chen, Q., Gu, J., and Chye, M. 2015. Expression of Arabidopsis acyl-CoA-binding proteins AtACBP1 and AtACBP4 confers Pb(II) accumulation in *Brassica juncea* roots. *Plant, Cell & Environment*, 38: 101-117.
19. **Du, Z.**, Chen, M., Chen, Q., Xiao, S., and Chye, M. 2013a. Arabidopsis Acyl-CoA-Binding Protein ACBP1 participates in the regulation of seed germination and seedling development. *The Plant Journal*, 74: 294-309.
20. **Du, Z.**, Chen, M., Chen, Q., Xiao, S., and Chye, M. 2013b. Overexpression of Arabidopsis Acyl-CoA-Binding Protein ACBP2 enhances drought tolerance. *Plant, Cell & Environment*, 36: 300-314.
21. **Du, Z.**, and Chye, M. 2013c. Interactions between Arabidopsis acyl-CoA-binding proteins and protein partners. *Planta*, 238: 239-245.
22. **Du, Z.**, Xiao, S., Chen, Q., and Chye, M. 2010a. Arabidopsis acyl-CoA-binding proteins ACBP1 and ACBP2 show different roles in freezing stress. *Plant Signaling & Behaviour*, 5: 607-609.
23. **Du, Z.**, Xiao, S., Chen, Q., and Chye, M. 2010b. Depletion of the membrane-associated acyl-CoA-binding protein ACBP1 confers freezing tolerance in Arabidopsis. *Plant Physiology*, 152: 1585-1597.
24. **Du, Z.**, and Wang, Y. 2008. Significance of RT-PCR expression patterns of *CYC*-like genes in *Oreocharis benthamii* (Gesneriaceae). *J. Syst. Evol.* 46: 23-31.

## Patents

1. Bonito, G., **Du, Z.**, Benning, C. US Patent 10858687. Lipid biosynthesis and abiotic stress resilience in photosynthetic organisms.
2. Chye, M., **Du, Z.**, Chen, Q. WO/2013/064119. Methods using acyl-coenzyme a-binding proteins to enhance drought tolerance in genetically modified plants.
3. Chye, M., **Du, Z.**, Chen, Q. EP Patent EP2773765A4. Methods using acyl-coenzyme a-binding proteins to enhance drought tolerance in genetically modified plants.
4. Chye, M., **Du, Z.**, Chen, Q. CA Patent CA2854069C. Methods using acyl-coenzyme a-binding proteins to enhance drought tolerance in genetically modified plants.
5. Chye, M., **Du, Z.**, Chen, Q. CN Patent CN104080915B. Methods using acyl-coenzyme a-binding proteins to enhance drought tolerance in genetically modified plants.

Creative Works (i.e., Extension Videos, Websites, Blogs, Creative Designs and Exhibitions, etc.)

<https://www2.hawaii.edu/~duz/>

<https://www.youtube.com/watch?v=AoFZZtYIRYc>

Leadership Roles (Committees, Boards, Advisory, etc.)

Associate editor, *Frontiers in Plant Science*.

Advisory board member, AntiAlias Ventures (<https://theantialias.com/>).

## **Graduate Students**

<u>Category</u>	<u>Current Number of Students</u>	<u>Number Graduated (Career)</u>
Member of PhD Committees	6	0

## **Grant Support**

Title of Grant: RII Track-2 FEC: Genome Engineering to Sustain Crop Improvement (GETSCI)

Source of Grant: NSF

Total Dollar Value (Your share of the grant value): \$3,993,756 (\$542,294.20)

Dates of Grant: 10/01/2021-09/30/2025

Role: (PI, CoPI,) Co-PI

## **Presentations at Conferences**

Title: Function and biosynthesis of lipids in microalgae

Authors (put an asterisk on the presenter): Zhi-Yan Du

Name of Conference: 2021 Symposium of natural product biotechnology

Location: Online

Date of Presentation: Jan 18, 2021

Title: Algal-fungal symbiosis leads to photosynthetic mycelium

Authors (put an asterisk on the presenter): Zhi-Yan Du\*, Christoph Benning, Gregory Bonito

Name of Conference: AlgalBBB 2021 - The International Conference on Algal Biomass, Biofuels and Bioproducts

Location: Online, Live & On-Demand

Date of Presentation: Jun 14, 2021