

**Wei Wen Su**  
College of Tropical Agriculture and Human Resources  
Department of Molecular Biosciences & Bioengineering  
FTE Distribution: 25% I; 75% R; 0% E

**Education**

<u>Degree</u>	<u>University</u>	<u>Major</u>
BS	National Cheng Kung Univ., Tainan, Taiwan	Chemical Engineering
MSE	Johns Hopkins University, Baltimore, MD	Chemical Engineering
PhD	Lehigh University, Bethlehem, PA	Chemical Engineering

**Professional Appointments**

<u>Title</u>	<u>Employer</u>	<u>Dates Employed</u>
Assistant Professor (Biosystems Engineering)	University of Hawaii at Manoa	1991-1997
Associate Professor (Biosystems Engineering)	University of Hawaii at Manoa	1997-2000
Associate Professor (Molecular Biosciences & Bioengineering)	University of Hawaii at Manoa	2000-2003
Professor (Molecular Biosciences & Bioengineering)	University of Hawaii at Manoa	2003-Date

**Courses Taught**

Course Number and Title (credits)

- BE260 Mass and Energy Balances (3 credits)
- BE/MBBE460 Bioreactor Design and Analysis (3 credits)
- MBBE/BE451 Synthetic Biology (3 credits; start in fall 2020)

**Publications (reverse chronological order)**

Refereed Journal Publications

1. Zhang, B., Han, Z., Kumar, S., Gupta, M., Su, W.W. 2019. Intein-Ubiquitin Chimeric Domain for Coordinated Protein Coexpression. *Journal of Biotechnology*, 304, 38-43.
2. Han, Z., Park, A., Su, W.W. 2018. Valorization of papaya fruit waste through low-cost fractionation and microbial conversion of both juice and seed lipid. *RSC Advances*, 8, 27963-27972. DOI: 10.1039/C8RA05539D
3. Cho, H.Y., Lee, T., Yoon, Y., Han, Z., Rabie, H., Lee, K.B., Su, W.W., Choi, J.W. 2018. Magnetic oleosome as a functional lipophilic drug carrier for cancer therapy. *ACS Appl. Mater. Interfaces*. DOI: 10.1021/acsami.7b19255
4. Han, Z., Su, W.W. 2018. Intein-mediated assembly of tunable scaffoldins for facile synthesis of designer cellulosomes. *Applied Microbiology & Biotechnology* 102(3), 1331-1342.
5. Zhang, B., Rapolu, M., Kumar, S., Gupta, M., Liang, Z., Han, Z., Williams, P.G., Su, W.W. 2017. Coordinated protein co-expression in plants by harnessing the synergy between an intein and a viral 2A peptide. *Plant Biotechnology Journal* 15, 718-728.
6. Provera, M., Han, Z., Liaw, B.Y., Su, W.W. 2016. Electrochemical power generation from culled papaya fruits. *J. Electrochem. Soc.* 2016 163(7): A1457-A1459; doi:10.1149/2.0051608jes
7. Liang, Z., Zhang, B., Su, W.W., Williams, P.G., Li, Q. X. 2016. C-Glycosylflavones Alleviate Tau Phosphorylation and Amyloid Neurotoxicity through GSK3 $\beta$  Inhibition. *ACS Chem. Neurosci.*, 7 (7), 912-923.
8. Watson, S.K., Han, Z., Su, W.W., Deshusses, M. A., Kan, E. 2016. Carbon dioxide capture using *Escherichia coli* expressing carbonic anhydrase in a foam bioreactor. *Environmental Technology*, 37(24), 3186-3192.

9. Zhang, B., Rapolu, M., Liang, Z., Han, Z., Williams, P.G., Su, W.W. 2015. A dual-intein autoprocessing domain that directs synchronized protein co-expression in both prokaryotes and eukaryotes. *Scientific Reports* 5, 8541; DOI:10.1038/srep08541.
10. Su, W.W. and Han, Z. 2013. Self-assembled synthetic protein scaffolds: biosynthesis and applications. *ECS Trans.* 50(28): 23-29.
11. Han, Z., Madzak, C., Su, W.W. 2013. Tunable nano-oleosomes derived from engineered *Yarrowia lipolytica*. *Biotechnol. Bioeng.* 110(3), 702-710.
12. Han, Z., Zhang, B., Wang, Y.E., Zuo, Y.Y., Su, W.W. 2012. Self-assembled amyloid-like oligomeric-cohesin scaffoldin for augmented protein display on the *Saccharomyces cerevisiae* cell surface. *Appl. Environ. Microbiol.* 78(9), 3249-3255.
13. Kubota, R., Alvarez, A.M., Su, W.W., Jenkins, D.M. 2011. FRET-based assimilating probe for sequence-specific real-time monitoring of loop-mediated isothermal amplification (LAMP). *Biological Engineering Transactions* 4(2), 81-100. Received the 2012 ASABE Superior Paper Award.
14. Yang, K., Jenkins, D.M., Su, W.W. 2011. Rapid concentration of bacteria using submicron magnetic anion exchangers for improving PCR-based multiplex pathogen detection. *J. Microbiological Methods* 86(1), 69-77.
15. Zhang, B., Rapolu, M., Huang, L., Su, W.W. 2011. Coordinate expression of multiple proteins in plant cells by exploiting endogenous kex2p-like protease activity. *Plant Biotechnology Journal* 9, 970-981.
16. Yang, K. & Su, W.W. 2011. Facile synthesis of metal-chelating magnetic nanoparticles by exploiting organophosphorous coupling. *Anal. Biochem.* 408(1), 175-177.
17. Yang, K., Xu, N.S., Su, W.W. 2010. Co-immobilized enzymes in magnetic chitosan beads for improved hydrolysis of macromolecular substrates under a time-varying magnetic field. *J. Biotechnol.* 148, 119-127.
18. Su, W.W. 2010. Bioreactors, Perfusion. In: Flickinger, M.C. (ed.) *Encyclopedia of Industrial Biotechnology*, pp. 978-993, Wiley, New York. (Invited book chapter contribution).
19. Jenkins, D.M., Zhu, C., Su, W.W. 2008. A simple hybrid circuit for direct determination of fluorescence lifetimes. *Applied Engineering in Agriculture.* 24(2):259-263.
20. Vardar-Schara, G., Krab, I.M., Yi, G., Su, W.W. 2007. A homogeneous fluorometric assay platform based on novel synthetic proteins. *Biochem. Biophys. Res. Commun.* 361, 102-108.
21. Peckham, G. D., Bugos, R.C., Su, W.W. 2006. Purification of GFP fusion proteins from transgenic plant cell cultures. *Protein Expr. Purif.* 49, 183-189.
22. Su, W.W. 2006. Bioreactor engineering for recombinant protein production using plant cell suspension culture. In: Dutta Gupta, S. and Ibaraki, Y. (eds.) *Plant Tissue Culture Engineering*. Springer, Berlin; pp. 135-159.
23. Su, W.W. and Lee, K.T. 2006. Plant cell and hairy-root cultures – process characteristics, products, and applications. In: Yang, S.T. (ed.) *Bioprocessing for Value-Added Products from Renewable Resources: New Technologies and Applications*, Elsevier, New York; pp. 263-292.
24. Su, W.W., Liu, B., Lu, W.B., Xu, N.S., Du, G.C., Tan, J.L. 2005. Observer-based online compensation of inner filter effect in monitoring fluorescence of GFP-expressing plant cell cultures. *Biotechnol. Bioeng.* 91(2), 213-226.
25. Su, W.W. 2005. Fluorescent proteins as tools to aid protein production. *Microbial Cell Factories* 4, 12.
26. Wang, M.L., Goldstein, C., Su, W.W., Moore, P.H., Albert, H.H. 2005. Production of biologically active GM-CSF in sugarcane: a secure biofactory. *Transgenic Research* 14, 167-178.
27. Parambam, R.I., Bugos, R., Su, W.W. 2004. Engineering green fluorescent protein as a dual functional tag. *Biotechnol. Bioeng.* 86(6), 687-97.
28. Su, W.W., Guan, P.Z., Bugos, R. 2004. High level of secretion of functional green fluorescent protein from transgenic tobacco cell cultures: characterization and sensing. *Biotechnol. Bioeng.* 85(6), 610-9.

29. Su, W.W., Li, J., Xu, N.S. 2003. State and parameter estimation of microalgal photobioreactor cultures based on local irradiance measurement. *J. Biotechnol.* 105(1,2), 165-178.
30. Su, W.W., Arias, R. 2003. Continuous plant cell perfusion culture: bioreactor characterization and secreted enzyme production. *J. Biosci. Bioeng.* 95(1), 13-20.
31. Li, J., Xu, N.S., Su, W.W. 2003. Online estimation of stirred-tank microalgal photobioreactor cultures based on dissolved oxygen measurement. *Biochem. Eng. J.* 14(1), 51-65.
32. Su, W.W. 2002. Bioprocess residence time distribution. In: Heldman, D. (ed.) *Encyclopedia of Agricultural & Food Engineering*. pp. 99 – 103. Dekkar, New York.
33. Su, W.W. 2002. Residence time distribution – biomedical, food, and environmental applications. In: Heldman, D. (ed.) *Encyclopedia of Agricultural & Food Engineering*. pp. 842 – 845. Dekkar, New York.
34. Zhang, J.N., Su, W.W. 2002. Estimation of intracellular phosphate content in plant cell cultures using extended Kalman filter. *J. Biosci. Bioeng.* 94 (1), 8-14.
35. Liu, S., Bugos, R., Dharmasiri, N., Su, W.W. 2001. Green fluorescent protein as a secretory reporter and a tool for process optimization in transgenic plant cell cultures. *J. Biotechnol.* 87 (1), 1-16.
36. Shi, H.D., Su, W.W. 2001. Display of green fluorescent protein on the *Escherichia coli* cell surface. *Enzyme & Microbial Technol.* 28, 25-34.
37. Chiou, S.Y., Su, W.W., Su, Y.C. 2001. Optimizing production of polyunsaturated fatty acids in *Marchantia polymorpha* cell suspension culture. *J. Biotechnol.* 85 (3), 247-257.
38. Su, W.W. 2001. Cell culture and regeneration of plant tissues. In: Hui, Y.H. (ed.) *Handbook of Transgenic Food Plants*. Dekkar, New York. Pp. 151-167.
39. Su, W.W. 2000. Perfusion bioreactors. In: Spier, R.E. (ed.) *Encyclopedia of Cell Technology*, Vol. 1, Wiley New York. pp. 230-242.
40. Su, W.W. 1999. Encapsulated plant cells: Techniques and applications. In: Kührtreiber, W.M., Lanza, R.P., Chick, W.L. (eds.) *Handbook of Cell Encapsulation and Therapeutics*. Birkhäuser, Boston. pp. 307-320.
41. Su, W.W. 1999. Bioreactor design for high-density plant cell cultures. *Recent Research Developments in Biotechnology and Bioengineering*, Vol. 2. Research Signpost, Trivandrum, India, pp. 235-253.
42. Su, W.W., Hwang, W.I., Kim, S.Y., Sagawa, Y. 1997. Induction of somatic embryogenesis in *Azadirachta indica*. *Plant Cell Tissue Organ Culture*, 50(2): 91-95.
43. Su, W.W., He, B.J. 1997. Secreted enzyme production by fungal pellets in a perfusion bioreactor. *J. Biotechnol.* 54: 43-52.
44. Su, W.W., He, B.J., Liang, H., Sun, S. 1996. A perfusion air-lift bioreactor for high-density plant cell cultivation and secreted protein production. *J. Biotechnol.* 50: 225-233.
45. Su, W.W., Lei, F., Kao, N.P. 1995. High-density cultivation of *Anchusa officinalis* in a stirred tank bioreactor with *in situ* filtration. *Appl. Microbiol. Biotechnol.* 44: 293-299.
46. Su, W.W. 1995. Bioprocessing technology for plant cell suspension cultures. *Appl. Biochem. Biotechnol.* 50: 189-230.
47. Su, W.W. 1995. *In situ* filtration of *Anchusa officinalis* culture in a cell-retention stirred tank bioreactor. *Biotechnol. Tech.* 9: 259-264.
48. Su, W.W., Asali, E.C., Humphrey, A.E. 1994. *Anchusa officinalis*: Production of rosmarinic acid in perfusion cell cultures. In Bajaj, Y.P.S. (ed.), *Biotechnology in Agriculture and Forestry*, Vol. 26, Medicinal and Aromatic Plants VI. Springer-Verlag, Berlin, pp. 1-20.
49. Su, W.W., Lei, F. 1993. Rosmarinic acid production in perfused *Anchusa officinalis* culture: Effect of inoculum size. *Biotechnol. Lett.* 15: 1035-1038.
50. Su, W.W., Lei, F., Su, L.Y. 1993. Perfusion strategy for rosmarinic acid production by *Anchusa officinalis*. *Biotechnol. Bioeng.* 42: 884-890.

51. Su, W.W., Humphrey, A.E. 1992. Production of plant secondary metabolites from high-density perfusion cultures. In Furusaki, S., Endo, I., Matsuno, R. (eds.), *Biochemical Engineering for 2001*. Springer-Verlag, Tokyo, pp. 266-269.
52. Su, W.W., Caram, H.S., Humphrey, A.E. 1992. Design of tubular microporous membrane-aerated bioreactors for plant cell cultures. In Furusaki, S., Endo, I., Matsuno, R. (eds.), *Biochemical Engineering for 2001*. Springer-Verlag, Tokyo, pp. 302-305.
53. Su, W.W., Caram, H.S., Humphrey, A.E. 1992. Optimal design of the tubular microporous membrane aerator for shear sensitive cell cultures. *Biotechnol. Prog.* 8: 19-24.
54. Su, W.W., Humphrey, A.E. 1991. Production of rosmarinic acid from perfusion culture of *Anchusa officinalis* in a membrane-aerated bioreactor. *Biotechnol. Lett.* 13: 889-892.
55. Su, W.W., Humphrey, A.E. 1990. Production of rosmarinic acid in the high-density perfusion culture of *Anchusa officinalis* using a high sugar medium. *Biotechnol. Lett.* 12: 793-798.
56. Malik, B., Su, W.W., Wald, H.L., Blumentals, I.I., Kelly, R.M. 1989. Growth and gas production for hyperthermophilic archaeobacterium, *Pyrococcus furiosus*. *Biotechnol. Bioeng.* 34: 1050-1057.
57. Paramswaran, A.K., Su, W.W., Schicho, R.N., Provan, C.N., Malik, B., Kelly, R.M. 1988. Engineering considerations for growth of bacteria at temperatures around 100°C. *Appl. Biochem. Biotechnol.* 18: 53-73.
58. Su, W.W., Kelly, R.M. 1988. Effect of hyperbaric oxygen and carbon dioxide on heterotrophic growth of the extreme thermophile *Sulfolobus acidocaldarius*. *Biotechnol. Bioeng.* 31: 750-754.

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

**Issued patents:**

- Su, W.W., Zhang, B. 2015. Auto-processing domains for polypeptide expression. US patent 8,945,876, issued 2/3/2015.
- Su, W.W. 2010. Cooperative reporter systems, components, and methods for analyte detection. US patent 7,741,128, issued 6/22/2010.
- Su, W.W. 2007. Sensor constructs and detection methods. US patent 7,247,443, issued 7/24/2007.
- Chang, S., Christopher, D., Vine, B., Su, W.W., Bugos, R. 2006. Plasmodium falciparum merozoite surface protein-1 malaria vaccine produced in transgenic plants. US Patent 7,037,681, issued 5/2/2006.
- Su, W.W. 1994. External-loop perfusion air-lift bioreactor. US Patent 5,342,781, issued 8/30/1994.

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

- University of Hawaii College of Tropical Agriculture & Human Resources (CTAHR) Dean's Advisory Board (1998)
- University of Hawaii Research Council (1998)
- Research Advisory Committee for the NSF-funded Marine Bioproducts Engineering Center (MarBEC) (2000)

**Graduate Students**

<u>Category</u>	<u>Current Number of Students</u>	<u>Number Graduated (Career)</u>
Chair of Master's Committees	-	19
Chair of PhD Committees	-	5
Member of Master's Committees	1	29
Member of PhD Committees	4	26
Advisor of postdoctoral fellows	1	14
Mentor for undergraduates	4	10

**Grant Support (since 2010)**

Improving cost-effectiveness of producing local aquatic feed from papaya fruit wastes via innovative bioprocessing  
 USDA CTSA  
 \$75,000 (Su: \$69,992)

2018-2021

PI

Plant and protein biotechnology research

UH Foundation

\$80,000

2016-2021

PI

Developing controlled-release antimicrobial products from papaya seed waste

USDA Hatch Supplemental

\$68,000

2017-2019

PI

Microbial conversion of waste lipids

Univ. Hawaii (undergrad research mentoring grant)

\$4,980

2019

PI

Waste papaya seed oil as emerging feedstock for producing animal feed and biofuel

USDA ARS

\$177,339

2015-2019

PI

Development of a proprietary gene-stacking technology for crops

Dow Agrosciences

\$156,954

2014-2017

PI

A novel enabling technology for advancing basic biomedical discoveries and synthesis of protein therapeutics

Hawaii Community Foundation

\$50,000

2014-2016

PI

Electrochemical conversion of papaya waste

USDA-ARS

\$101,361

2014-2015

PI

Bioengineering surfactant-like proteins for agricultural biotechnology applications

USDA-Hatch Supplemental

\$50,000

2014-2016

PI

Natural whole-cell oil microcapsules as innovative enrichment diets for live feeds

USDA CTSA

\$63,500 (Su: \$50,000)

2013-2015

PI

Development of a proprietary gene-stacking technology for crops  
Dow Agrosiences  
\$22,000  
2012-2014  
PI

A new technology for gene stacking in plants  
USDA-Hatch Supplemental  
\$44,000  
2011-2013  
PI

Multifunctional oleosomes as nanocarriers for cancer therapy  
Hawaii Community Foundation  
\$50,000  
2011-2013  
PI

Development of a proprietary nanoparticle mixing technology  
Millipore Co.  
\$8,000  
2011  
PI

Cooperative synthesis of cellulosomes by an engineered yeast consortium to improve lignocellulose bioconversion  
USDA-AFRI  
\$150,000  
2010-2013  
PI

#### **Selected Recent Presentations at Conferences**

Title: Advances in Plant Cell Culture Engineering

Authors: Wei Wen Su\*

Name of Conference: Korean Society for Biotechnology and Bioengineering (KSBB) 2018 Annual Meeting;  
Nanobiotechnology & Cell Engineering II (keynote speaker)

Location: Seoul, Korea

Date of Presentation: 10/10/2018

Title: Oleosome-based bionanotechnology - development and applications

Authors: Wei Wen Su\*

Name of Conference: Korean Society for Biotechnology and Bioengineering (KSBB) 2017 Spring Meeting;  
Frontiers in Nanobiotechnology (keynote speaker)

Location: Seoul, Korea

Date of Presentation: 04/06/2017