

# Chung-Ju Rachel Wang

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## Education

1998-2003 Ph.D. Institute of Botany, National Taiwan University, Taipei, Taiwan.

1996-1998 M.Sc. Institute of Botany, National Taiwan University, Taipei, Taiwan.

1992-1996 B.Sc. Institute of Botany, National Taiwan University, Taipei, Taiwan.

## Professional Experience

2011-present Assistant Research Fellow, Institute of Plant and Microbial Biology, Academia Sinica, Taiwan.

2018-present Adjunct Assistant Professor, Graduate Program in Plant Sciences of National Central University, Taiwan.

2013-present Adjunct Assistant Professor, Graduate Institute of Life Sciences, National Defense Medical Center, Taiwan.

2011-present Adjunct Assistant Professor, Biotechnology Center, National Chung Hsing University, Taiwan.

2009-2011 Associate Scientist, Department of Molecular & Cell Biology, UC Berkeley, USA.

2004-2009 Postdoctoral Fellow, Department of Molecular & Cell Biology, UC Berkeley, USA.

2003-2004 Postdoctoral Fellow, Institute of Plant and Microbial Biology, Academia Sinica, Taiwan.

## Awards and Honors

2018 **Innovative Research Award**, Professor Chiu-Lung Lin Foundation

2016 The 9th **Shang-Fa Yang Young Scientist Award**

2015 Our paper published in *The Plant Cell* was selected as “the **Noteworthy Maize Primary Literature**” (MaizeGDB)

2013 **Taipei Society Excellent Youth Award**

2013 **Career Development Award** (Academia Sinica)

## Professional Activities

### I. International Boards

2018-2021 External Advisory Board member of **Horizon 2020-European.1.3.1 Programme**, “Meiotic Control of Recombination in Crops (MEICOM)” research project.

2015 Editorial Board Member of the **MaizeGDB** (Maize Genetics and Genomics Database).

## **II. International Journals**

2015-present **Editor**, Frontiers in Plant Science. Plant Genetics and Genomics Section.

2014 **Associate Editor**, Frontiers Research Topic: Plant Meiosis (special issue).

## **III. International Conferences (Speaker and Session Chair)**

- 2019 EMBO Workshop on Meiosis (La Rochelle, France).
- 2019 Annual Meeting of the Japanese Society of Plant Physiologists (Nagoya, Japan).
- 2019 PAG XXVII Plant & Animal Genome Conference (CA, USA).
- 2018 MEICOM Horizon 2020 Annual Meeting (Birmingham, UK).
- 2017 Cold Spring Harbor Asia Conference on Plant Cell and Developmental Biology (Suzhou, China).
- 2017 59th Annual Maize Genetics Conference (MO, USA).
- 2016 Gordon Research Conferences-Meiosis (NH, USA).
- 2015 12th Advanced Imaging Conference (CA, USA), also as **session chair**.
- 2014 Gordon Research Conferences-Meiosis (NH, USA), also as **session chair**.
- 2014 56th Annual Maize Genetics Conference (Beijing, China).
- 2013 International Symposium on Plant Meiosis (Shanghai, China), also as **session chair**.
- 2012 22nd International Congress on Sexual Plant Reproduction (Melbourne, Australia), also as **session chair**.

## **IV. International Conferences (Organizer)**

- 2018 International Chromosome Biology Symposium, Academia Sinica, Taiwan.
- 2017 7th Asian Symposium on Plant Lipid, Academia Sinica, Taiwan.
- 2015 International RecA and Chromosome Biology Conference, Academia Sinica, Taiwan.
- 2014 International Symposium on Plant Sexual Reproduction, Academia Sinica, Taiwan.

## **V. Domestic Conferences (Speaker)**

- 2019 Annual Meeting and Symposium on Innovative Plant Sciences, Taiwan.
- 2018 International Chromosome Biology Symposium, Taiwan.
- 2016 Annual Meeting and Symposium on Innovative Plant Sciences, Taiwan.
- 2016 Cross-Strait Conference on Plant Molecular Biology, Taiwan.
- 2015 International RecA and Chromosome Biology Conference, Taiwan.
- 2014 International Symposium on Plant Sexual Reproduction, Taiwan.
- 2011 Annual Meeting and Symposium on Innovative Plant Sciences, Taiwan.
- 2011 Taiwan Molecular Biology Summer Retreat, Taiwan.
- 2011 Bilateral Symposium on Bioimaging between Academia Sinica and Singapore, Taiwan.

2011 Taiwan-France “Chromosome Biology” Symposium, Taiwan.

## Invited Seminars

### International:

- 2020 Max Planck Institute for Plant Breeding Research in Cologne (Host: Raphael Mercier and Yazhong Wang)
- 2015 Stanford University (Host: Anne M. Villeneuve)
- 2015 University of California, Berkeley (Host: Zinmay Renee Sung)
- 2013 University of Minnesota (Host: Changbin Chen)

### Domestic:

- 2020 National Taiwan University (Host: Huang-Lung Tsai)
- 2018 National Taiwan University (Host: Ya-Yun Wang)
- 2012 National Cheng-Kung University (Host: Ruey-Hua Lee)
- 2012 Biotechnology Center in Southern Taiwan, Academia Sinica (Host: Su-Chiung Fang)
- 2012 National Chung Hsing University (Host: Hau-Hsuan Hwang)

## Outreach Activity

- 2020 Career Sharing Talk (Taoyuan Municipal Wu-Ling Senior High School).
- 2013-present Biological Training Programs for Selected Senior High School Students (Mentor, Lecturer)
- 2017 Academia Sinica social media interview  
<https://research.sinica.edu.tw/meiosis-corn/>  
<https://research.sinica.edu.tw/meiosis-wang-chung-ju-qa/>
- 2017 MOST social media interview (Fantastic Female Scientists and Where to Find Them)  
<https://ipmb.sinica.edu.tw/rwang/image/scientists.pdf>
- 2016 A published image (Figure 6 in Plant Cell, 27:2519-2529) was included and introduced in the textbook “Biology: Concepts and Applications,” 10th edition by Starr et al.
- 2016 A published image (Figure 1 in Genetics, 183:905-915) were included in the textbook “Molecular Biology of the Cell”, 6th edition by Alberts et al.
- 2016 MOST Research Training Summer Program for European Youth (Final report, Chair).
- 2016 National Taiwan Science Education Center- Science Fairs of Senior High School (Advisor).
- 2015 A research image (Figure 6 in Plant Cell, 27:2519-2529) was selected by the Gordon Research Conference Organization, as a conference announcement, Science, (2014) 343: 902-926.
- 2014 I edited a biology textbook for junior high school in Taiwan (San Min Book).

## Competitive Grants

- 2018-2021 Elucidating the structure of SPO11, its functions and its Interactions. 107-2923-B-002-001-MY4. MOST-ANR French Bilateral Grant.
- 2018 Roles of DNA methylation and its reprogramming during plant germ cell development. 107-2311-B-001-008, MOST, Taiwan.
- 2018 A safe journey to the ovule: rapid and practical transformation of maize. Grand Challenge Program: seed grant, Academia Sinica, Taiwan.
- 2015-2018 Studies of maize Ameiotic1 gene functions and its possible applications in apomixes. 104-2311-B-001-021-MY3, MOST, Taiwan.
- 2013-2017 Molecular mechanisms of meiosis initiation and termination in plants. 102-CDA-L01, Career Development Award, Academia Sinica, Taiwan.
- 2014 Interplay between chromatin structure, synaptonemal complex and homologous recombination. 103-2311-B-001-014, MOST, Taiwan.
- 2013 Molecular and genetic dissection of synaptonemal complex. 102-2311-B-001-005. MOST, Taiwan.
- 2012 Molecular roles of maize DSY2 in homologous pairing and synapsis. 101-2311-B-001-035, MOST, Taiwan.

## Community Services

### Committee service in Academia Sinica:

- Academia Sinica Newsletter Editor (2018-2020)
- The Faculty Dormitory Committee (2017-2020)
- Advanced Light Microscopy, Chair (2016-2017)

### Committee service in IPMB:

- Strategic Planning Committee (2019-2020)
- Plant Growth Facility, Greenhouse Committee (2018-2020)
- IPMB Director Search Committee (2017-2018)
- Young Investigator Committee (2011-2012)
- Entertainment (2012, 2017, 2018)
- Plant Cell Biology Core Facility Committee (2012-2013)
- Seminar Committee (2012-2017)
- Space Committee (2013-2016)

## Teaching

### Taiwan International Graduate Program - MBAS, Academia Sinica

- Advanced Plant Biology: 2018, 2019 (Lecturer)
- Plant Reproductive Biology: 2012, 2014, 2017 (Coordinator)
- Principles and Methods in Plant Biology Research: 2012, 2014 (Lecturer)

Plant Genetics and Genomics: 2011, 2013, 2015 (Lecturer)

**Taiwan International Graduate Program - MCB, Academia Sinica**

Molecular and Cell Biology: 2014-2019 (Lecturer)

Chromosome Biology: 2013, 2014, 2016 (Lecturer)

**National Yang-Ming University**

Plant Physiology: 2012, 2014, 2016, 2018, 2019 (Lecturer)

**National Central University**

Advanced Plant Biology: 2019, 2020 (Lecturer)

**National Taiwan University**

Epigenetics: 2011 (Lecturer)

**Supervision of Students/Postdoc**

**Postdoctoral Fellow**

Pearl Chang (Now Assistant Professor in National Pingtung University)

Shu-Yun Chen (Now Postdoctoral Fellow in Cheng Kung University)

Jeremy Catinot (present)

**Ph.D. Program**

Ding-Hua Lee (Now Postdoctoral Fellow in Purdue University)

Ching-Chih Tseng (present)

Mitylene Bailey (present)

**Undergraduate Summer Interns**

Yu-Hung Hsiao, Chen-Jun Lin (2011)

Michelle Cheng (2012)

Geng-Zhan Zhang, Yun-Jhih Shih (2013)

Ching-Fan Chiang, Chia-Ching Liou, Yun-Jhih Shih (2014)

Chen-Yu Kuan (2015)

Ting-Yu Hsu (2016)

Strong Tsu-Wang Sun (2017)

Tse-Yu Chen, Yun-Kai Chou, Yu-Ting Hong (2018)

Marc Dawen, Tzu-Han Hwang (2019)

**Publications**

1. Ku JC, Ronceret A, Golubovskaya I, Lee DH, Wang CT, Timofejeva L, Kao YH, Angoa AKG, Kremling K, Williams-Carrier R, Meeley R, Barkan A, Cande WZ and **Wang CJR\*** (2020) Dynamic localization of SPO11-1 and conformational changes of meiotic axial elements during recombination initiation of maize meiosis. PLoS Genetics. In revision.
2. Tseng CC, Wang CT, Shi YZ, Kao YH, Jeng ST and **Wang CJR\*** (2020) Soma-germline communication is required for mitotic quiescence and synchronous meiotic initiation of pollen mother cells in maize. Plant Cell. In revision.

3. Albert PS, Zhang T, Semrau K, Rouillard JM, Kao YH, **Wang CJR**, Danilova TV, Jiang J and Birchler, JA\* (2019) Chromosome paints in maize reveal rearrangements, nuclear domains and evolutionary relationships. *Proc Natl Acad Sci USA*, 116: 1679-1685.
4. Wang C , Li X , Huang J, d , Lu P , Ma H, **Wang CJR\*** and Wang Y\* (2019) Isolation of meiocytes and cytological analyses of male meiotic chromosomes in soybean, lettuce and maize. In Reichmann JL, Ferrándiz C (Eds.), *Flower Development: Methods and Protocols*. New York: Springer (book chapter).
5. Hsu FM, **Wang CJR\*** and Chen PY\* (2018) Reduced representation bisulfite sequencing in maize. *Bio-Protocol*, 8(6):e2778.
6. Chang P, Tseng YF, Chen PY\* and **Wang CJR\*** (2018) Using flow cytometry to isolate maize meiocytes for next generation sequencing: A time and labor efficient method. *Current Protocol of Plant Biology*, 3(2):e20068.
7. Hsu FM, Yen MR, Wang CT, Lin CY, **Wang CJR\*** and Chen PY\* (2017) Optimized reduced representation bisulfite sequencing reveals tissue-specific mCHH islands in maize. *Epigenetics and Chromatin*, 10:42.
8. Lambing C, Franklin FCH and **Wang CJR\*** (2017) Understanding and manipulating meiotic recombination in plants. *Plant Physiology*, 173:1531-1542.
9. Hsieh HM, Chung MC, Chen PY, Hsu FM, Liao WW, Sung AN, Lin CR, **Wang CJR**, Kao YH, Fang MJ, Lai CY, Huang CC, Chou JC, Chou WN, Chang BCH and Ju YM\* (2017) A termite symbiotic mushroom maximizing sexual activity at growing tips of vegetative hyphae. *Botanical Studies*, 58:39.
10. Lee DH, Kao YH, Ku JC, Lin CY, Meeley R, Jan YS and **Wang CJR\*** (2015) The axial element protein DESYNAPTIC2 mediates meiotic double-strand break formation and synaptonemal complex assembly in maize. *Plant Cell*, 27:2519-2529.
11. **Wang CJR\*** and Tseng CC (2014) Recent advances in understanding of meiosis initiation and the apomictic pathway in plants. *Frontiers in Plant Science*, 5, 497:1-6.
12. **Wang CJR\*** (2013) Analyzing maize meiotic chromosomes with structured illumination microscopy. In Pawlowski WP, Grelon M, Armstrong S (Eds.), *Methods in Molecular Biology*, pp 67-78. New York: Springer (Invited book chapter)
13. Moon J, Skibbe D, Timofejeva L, **Wang CJR**, Kelliher T, Kremling K, Walbot V and Cande WZ\* (2013) Regulation of cell divisions and differentiation by MALE STERILITY32 is required for anther development in maize. *Plant Journal*, 76:592-602.
14. Timofejeva L, Skibbe D, Lee S, Golubovskaya IN, **Wang CJR**, Harper L, Walbot V and Cande WZ\* (2013) Cytological characterization and allelism testing of anther developmental mutants identified in a screen of maize male sterile lines. *Genetics* **G3**, 3:231-249.
15. **Wang CJR**, Nan G, Kelliher T, Timofejeva L, Vernoud V, Golubovskaya IN, Harper L, Egger R, Walbot V and Cande WZ\* (2012) Maize *Multiple archesporial cells 1 (Mac1)*, an ortholog of rice *TDL1A*, modulates cell proliferation and identity in early anther development. *Development*, 139:2594-2603.
16. Nan GL, Ronceret A, **Wang CJR**, Fernandes JF, Cande WZ and Walbot V\* (2011) Global transcriptome analysis of two ameiotic1 alleles in maize anthers: defining steps in meiotic entry and progression through prophase I. *BMC Plant Biology*, 11:120.
17. Paredes AR, Assaf ZJ, Sept D, Timofejeva L, Dawson SC, **Wang CJR** and Cande WZ\* (2011) An actin cytoskeleton with evolutionarily conserved functions in the absence of canonical actin-binding proteins. *Proc Natl Acad Sci USA*, 108:6151-6156.

18. Golubovskaya IN, **Wang CJR**, Timofejeva L and Cande WZ\* (2011) Maize meiotic mutants with improper or nonhomologous synapsis due to problems in pairing or synaptonemal complex formation. ***Journal of experimental botany***, 62:1533-1544. (The first two authors contributed equally to this work) (Journal cover).

#### **Before joining IPMB (till 2010)**

19. **Wang CJR**, Carlton PM, Golubovskaya IN and Cande WZ\* (2009) Interlock formation and coiling of meiotic chromosome axes during synapsis. ***Genetics***, 183:905-915.
20. Pawlowski WP, **Wang CJR**, Golubovskaya IN, Szymaniak JM, Shi L, Hamant O, Zhu T, Harper L, Sheridan WF and Cande WZ\* (2009) Maize AME10TIC1 is essential for multiple early meiotic processes and likely required for the initiation of meiosis. ***Proc Natl Acad Sci USA***, 106: 3603–3608. (The first two authors contributed equally to this work).
21. Cande WZ\*, Golubovskaya IN, **Wang CJR** and Harper LC (2009) Meiotic genes and meiosis in maize. In Bennetzen JL, Hake S (Eds), ***Handbook of Maize-Volume II***, pp. 353-375, New York: Springer. (Book chapter)
22. Poxleitner MK, Carpenter ML, Mancuso JJ, **Wang CJR**, Dawson SC and Cande WZ\* (2008) Evidence for karyogamy and exchange of genetic material in the binucleate intestinal parasite *Giardia intestinalis*. ***Science***, 319:1530-1533.
23. Harper LC, Timofejeva L, **Wang CJR**, Golubovskaya IN, Walbot V and Cande WZ\* (2008) Screening male-sterile mutants in Berkeley for anther development mutants. ***Maize News Letter***, 82:6.
24. Gustafsson MG\*, Shao L, Carlton PM, **Wang CJR**, Golubovskaya IN, Cande WZ, Agard DA and Sedat JW (2008) Three-dimensional resolution doubling in widefield fluorescence microscopy by structured illumination. ***Biophysical Journal***, 94:4957-4970.
25. Li J, Harper LC, Golubovskaya IN, **Wang CJR**, Weber D, Meeley RB, McElver J, Bowen B, Cande WZ and Schnable PS\* (2007) Functional analysis of maize RAD51 in meiosis and DSBs repair. ***Genetics***, 176:1469-1482.
26. Harper LC, **Wang CJR** and Cande WZ\* (2007) Identifying low-copy loci by FISH on chromosomes in 3D: position of p1, the 22KDa alpha zein cluster and the 5S rDNA locus. ***Maize News Letter***, 81:6.
27. Golubovskaya IN, Hamant O, Timofejeva L, **Wang CJR**, Braun D, Meeley R and Cande WZ\* (2006) Alleles of *afd1* dissect REC8 functions during meiotic prophase I. ***Journal of cell science***, 119:3306-3315.
28. **Wang CJR**, Harper L and Cande WZ\* (2006) High resolution single-copy gene FISH and its use in the construction of a cytogenetic map of maize chromosome 9. ***Plant Cell***, 18:529-544.
29. **Wang CJ** and Chen CC\* (2005) Cytogenetic mapping in maize. ***Cytogenetic and Genome Research***, 109:63-69.
30. Hsu FC, **Wang CJ**, Chen CM, Hu HY and Chen CC\* (2003) Molecular characterization of a family of tandemly repeated DNA sequences, TR-1, in heterochromatic knobs of maize and its relatives. ***Genetics***, 164:1087-1097. (The first two authors contributed equally to this work)
31. **Wang CJ** and Chen CC\* (2003) Localization of centromere and telomere sequences on maize pachytene chromosomes by fluorescence in situ hybridization. ***BioFormosa***, 38: 17-25.
32. Chen CC\*, Chen CM, Hsu FC, **Wang CJ**, Yang JT and Kao YY (2000) The pachytene chromosomes of maize as revealed by fluorescence in situ hybridization with repetitive DNA sequences. ***Theoretical and***

*Applied Genetics*, 101:30-36.

33. Chen CM, Wang CT, **Wang CJ**, Ho CH, Kao YY and Chen CC\* (1997) Two tandemly repeated telomere-associated sequences in *Nicotiana plumbaginifolia*. ***Chromosome Research***, 5:561-568.

### Citation index:

Google Scholar (as of December, 2019)

<https://scholar.google.com.tw/citations?user=-jwQUfMAAAAJ&hl=zh-TW>

Total Citation number: 2203

Citation since 2013: 1337

H-index: 17

i10-index: 21