

Zhijie WANG

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CAREER PROFILE

- Nine years experiences in remote sensing and plant science
 - Five years experiences in agricultural technologies extension
 - Solid background and professional skills in nitrogen management of cereal crop production, including field data acquisition, lab analysis, statistical analysis of plot, field and regional landscaping data, satellite image process and vegetation index application in crop stress detection and grain yield prediction
 - Project design, proposal drafting, progress and final reports, and scientific publications
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WORK EXPERIENCE

Apr. 2009 - present Post-doc fellow of University of Lethbridge
Lethbridge, Alberta, Canada

Major responsibilities:

- BRDF data acquisition and analysis
- Landsat TM and SPOT images processing
- Scientific paper writing
- Cooperative research establishment

Jan. 2006 - Mar. 2009 Post-doc fellow managed by Natural Sciences Engineering Research Council of
Canada (NSERC)
Agriculture and Agri-Food Canada (AAFC)
St-Jean-sur-Richelieu, Quebec, Canada

Major responsibilities:

- Photosynthesis, fluorescence, and ground-based hyperspectral data acquisition
- Statistical analysis
- Scientific paper writing
- Cooperative research establishment
- Supervising Ph.D. students for field data collection and processing

Key Accomplishments:

- Six scientific papers completed

- Cooperation has been established between my supervisor and the counterpart scientists in China
- Hired four students and one visiting fellow from China

Dec. 2004-Nov. 2005 Visiting scientist
 Japan International Research Center for Agricultural Sciences (JIRCAS)
 Tsukuba, Ibaraki, Japan

Major responsibilities:

- Landsat TM image processing
- Wheat grain yield prediction model development
- Research report writing

Key Accomplishments:

- One research report completed
- Skills in softwares of ENVI, ERDAS and ArcGIS were improved

Sep. 1993-Aug. 1998 Agronomist
 Agricultural Bureau of Anyang County
 Anyang, Henan Province, China

Major responsibilities:

- Development of strategies for crop management
- Field management supervision
- Project application
- Annual report writing

Key Accomplishments:

- Helped local farmers increased their productions and profits
- Four awards from Ministry of Agriculture of the People's Republic of China

EDUCATION

Sep. 2001-Jul. 2004 China Agricultural University
 Beijing, China
 Ph.D, major in Plant Science

Sep. 1998-Jun. 2001 Henan Agricultural University
 Zhengzhou, Henan province, China
 M.Sc., major in Plant Science

Sep. 1989-Jul. 1993 Henan Agricultural University
 Zhengzhou, Henan province, China
 B.Sc., major in Agronomy

ACADEMIC AWARDS AND SCHOLARSHIPS:

- National Agriculture, Animal Husbandry and Fishery FENGSHOU Award, level 2 twice and level 3 twice, in 1994, 1995, 1996 and 1998, respectively
 - Scholarship level 1 in 1992 and level 2 in 1991
 - DADI scholarship, sponsored by a American-Chinese group, in 2000
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RESEARCH INTERESTS AND PROFESSIONAL DEVELOPMENT

I am interested in **remote sensing and plant science**. When I was a master student, I was involved in exploring the characteristic of winter wheat in terms of physiological traits, such as photosynthesis rate of both canopy and single blade, key enzyme (RUBPcase) of photosynthesis and carboxylation efficiency, and canopy structure. When pursuing my doctoral research, I was interested in the dynamic of nitrogen (N) translocation in wheat cultivars with different canopy structures and **N status diagnosing with remote sensing technique**. Methods were developed to predict winter wheat N status and grain quality with ground measured hyperspectral data. I am also interested in the detection of N status in middle and bottom layers of wheat canopy and a method for this purpose had been established. In Japan, I carried out a research entitled "Crop monitoring methods using remote sensing and GIS" under the auspices of the Japan International Research Center for Agricultural Sciences (JIRCAS) Visiting Research Fellowship Program. A model for winter wheat **grain yield estimation** was developed with Landsat5 TM and Landsat7 ETM+ images. As a visiting scientist (post-doc fellow managed by NSERC) of Agriculture and Agri-Food Canada, my research has been focused on the diagnosis of crop N status with **chlorophyll meter, Dualex, Yara N Sensor and GreekSeeker**. The strategies for wheat and corn N status assessment have been developed with the ratio of chlorophyll meter reading to Dualex reading and NDVI measured with both Yara N Sensor and GreenSeeker. The rule of **saturated reference plot** in N fertilizer rate recommendation has also been assessed.

ADDITIONAL PROFESSIONAL SKILLS

- Sound academic background of diverse field crops production
 - Strong professional knowledge of research methodology
 - Solid knowledge of field plots techniques, field crops management, field and lab data acquisition, statistical analysis and interpretation
 - Skills of research project development, monitoring and evaluation
 - Skills of satellite image processing with ENVI and ERDAS softwares
 - Proficient in the interpretation of ground-based hyperspectral data and vegetation index application
 - Ability to work effectively in a multi-disciplinary research environment, both independently and as a team member, and use initiative to accelerate my research
 - Enthusiastic to travel and interaction with farmers and partner organizations
 - Driver's licence
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PUBLICATIONS

Peer-reviewed papers

- [1] Ma, D., T. Guo, Z. Wang, C. Wang, Y. Zhu, and Y. Wang. Influence of nitrogen fertilizer application rate on winter wheat (*Triticum aestivum* L.) flour quality and Chinese noodle quality. *J. Sci. Food Agric.* (in press)
- [2] Tremblay, N., Z. Wang, and C. Bélec. Performance of Dualex in spring wheat (*Triticum aestivum* L.) for nitrogen status assessment, yield prediction and estimation of soil nitrate content. *J. Plant Nutr.* (accepted)
- [3] Wang, J., Z. Wang, S. Uchida, and W. Huang. 2009. Relative discrimination of planophile and erectophile wheat types using multi-temporal spectrum measurements. *Jpn. Agri. Res. Quart.* 43(2): 157-166.
- [4] Tremblay, N., Z. Wang, B. L. Ma, C. Belec, and P. Vigneault. 2009. A comparison of crop data measured by two commercial sensors for variable-rate nitrogen application. *Precis. Agric.* 10: 145-161.
- [5] Tremblay, N., Z. Wang, and C. Bélec. 2007. Evaluation of the Dualex for the assessment of corn nitrogen status. *J. Plant Nutr.* 30:1355-1369.
- [6] Wang, Z., J. Wang, C. Zhao, M. Zhao, W. Huang, and C. Wang. 2005. Vertical distribution of nitrogen in different layers of leaf and stem and their relationship with grain quality of winter wheat. *J. Plant Nutr.* 28:73-91.
- [7] Wang, Z., J. Wang, L. Liu, W. Huang, C. Zhao, and Y. Lu. 2005. Estimation of nitrogen deficiency at middle and bottom layers of winter wheat canopy by using ground measured canopy reflectance. *Commun. Soil Sci. Plan.* 36:2289-2302.
- [8] Wang, J., C. Zhao, W. Huang, L. Liu, Z. Wang, and C. Tan. 2005. Extraction of crop closures and structural types from canopy reflected spectrum in wheat and maize. *Int. Geosci. Remote Sens. Sym. (IGARSS)* 5:3040-3043.
- [9] Huang, W., J. Wang, L. Liu, J. Wang, C. Tan, C. Li, Z. Wang, and X. Song. 2005. Remote sensing identification of plant structural types based on multi-temporal and bidirectional canopy spectrum. *Trans. Chn. Soc. Agric. Eng.* 21:82-86. (EI) (in Mandarin with English abstract)
- [10] Wang, Z., J. Wang, L. Liu, W. Huang, C. Zhao, and C. Wang. 2004. Prediction of grain protein content in winter wheat using plant pigment ratio (PPR). *Field Crop Res.* 90:311-321.
- [11] Huang, W., J. Wang, Z. Wang, C. Zhao, and L. Liu. 2004. Inversion of foliar biochemical parameters at various physiological stages and grain quality indicators of winter wheat with canopy reflectance. *Int. J. Remote Sen.* 25:2409-2419.
- [12] Zhao, C., L. Liu, J. Wang, W. Huang, X. Song, C. Li, and Z. Wang. 2004. Methods and application of remote sensing to forecast wheat grain quality. *Int. Geosci. Remote Sens. Sym. (IGARSS)* 6: 4008-4010.
- [13] Huang, W., J. Wang, L. Liu, Z. Wang, C. Tan, X. Song, and J. Wang. 2004. Cultivar, nitrogen and irrigation influence on grain quality and its forecasting methods by in situ reflected spectrum of winter wheat. *Agri. Sci. China* 3:831-841. (in English)
- [14] Huang, W., J. Wang, L. Liu, C. Zhao, Z. Wang, and J. Wang. 2004. Inversion of biochemical parameters by selection of proper vegetation index in winter wheat. *Agri. Sci. China* 3:178-185. (in English)
- [15] Wang, Z., J. Wang, C. Zhao, W. Huang, Z. Ma, and M. Zhao. 2004. Study on the nitrogen transfer in different leaf in canopy by using isotope ^{15}N labeled on leaf. *Acta Agric. Boreal.-Sin.* 18:71-75. (in Mandarin with English abstract)
- [16] Wang, Z., T. Guo, Y. Zhu, Y. Wang, J. Wang, and M. Zhao. 2004. Study on CO_2 assimilation capacity during flag leaf ageing in super-high-yield winter wheat. *Acta Agron. Sin.* 30:836-841. (in Mandarin with English abstract)

- [17] Wang, Z., J. Wang, W. Huang, Z. Ma, B. Wang, C. Zhao, and M. Zhao. 2004. The properties of temporal and spatial distributions of leaf nitrogen and the relationship between leaf nitrogen and grain quality in winter wheat. *Acta Agron. Sin.* 30:700-707. (in Mandarin with English abstract)
- [18] Wang, J., Z. Wang, W. Huang, Z. Ma, L. Liu, and C. Zhao. 2004. The vertical distribution characteristic and spectral response of canopy nitrogen in different layer of winter wheat. *J. Remote Sen.* 8:36-43. (in Mandarin with English abstract)
- [19] Wang, Z., J. Wang, Z. Ma, W. Huang, and M. Zhao. 2004. The vertical distribution of nitrogen and NRA in canopy of winter wheat. *J. Tricic. Crops* 24:31-34. (in Mandarin with English abstract)
- [20] Wang, C., C. Zhao, J. Wang, J. Wang, L. Liu, P. Wang, J. Jing, and Z. Wang. 2003. Correlation analysis between hyperspectral feature and foliage water content in the growth period of winter wheat. *Int. Geosci. Remote Sens. Sym. (IGARSS)* 6:3778-3780.
- [21] Wang, Z., T. Guo, Y. Zhu, J. Wang, and M. Zhao. 2003. Study on the character of light radiation in canopy of super-high-yielding winter wheat. *Acta Bot. Boreal.-Occid. Sin.* 23:1657-1662. (in Mandarin with English abstract)
- [22] Wang, Z., J. Wang, W. Huang, Z. Ma, and M. Zhao. 2003. Study on nitrogen distribution in leaf, stem and sheath at different layers in winter wheat canopy and their influence on grain quality. *Agri. Sci. China* 2:859-866. (in English)
- [23] Guo, T., Z. Wang, and Y. Wang. 2002. Study on diurnal changes of flag leaf photosynthetic rate for two spiketype cultivars of wheat. *Acta Bot. Boreal.-Occid. Sin.* 22:554-560. (in Mandarin with English abstract)
- [24] Zhao, C., W. Huang, Z. Wang, B. Wang, and J. Wang. 2002. Study on the Relationship of canopy water content and canopy temperature of winter wheat under different water and nitrogen conditions. *Chn. Soc. Agric. Eng.* 18:25-28. (E1) (in Mandarin with English abstract)
- [25] Wang, Z., T. Guo, H. Wang, and Y. Wang. 2001. Effects of planting density on photosynthetic characteristics and grain yield of super-high-yield winter wheat at late growth stages. *J. Tricic. Crops* 21:64-67. (in Mandarin with English abstract)
- [26] Guo, T., Z. Wang, T. Hu, Y. Zhu, C. Wang, H. Wang, and Y. Wang. 2001. Study on canopy apparent photosynthesis characteristics and grain yield traits of two winter wheat cultivars with different spike type. *Acta Agron. Sin.* 27:633-639. (in Mandarin with English abstract)
- [27] Zhao, C., Z. Wang, J. Wang, and W. Huang. Assessment of canopy nitrogen status in winter wheat (*Triticum aestivum* L.) with spectral shape features. (Under review by *Int. J. Remote Sen.*)
- [28] Wang, Z., N. Tremblay, P. Vigneault, and M. Y. Bouroubi. Wheat (*Triticum aestivum* L.) Nitrogen sufficiency index as affected by soil electrical conductivity, topography and measurement date. (Under review by *Precis. Agri.*)
- [29] Wang, J., Z. Wang, W. Huang, and T. Guo. Early detect canopy chlorophyll deficiency in winter wheat (*Triticum aestivum* L.) with hyperspectral measurement. (Will be submitted to *Precis. Agri.*)

Book chapters

Zhao, C., W. Huang, Z. Wang, and J. Zhou. 2008. The strategy for crop precision management based on remote sensing techniques. P. 207-258. *In* J. Wang, C. Zhao, and W. Huang. (eds.) *Fundamentals and Applications of Agricultural Quantitative Remote Sensing*. Science Press, Beijing, China.

Conference proceedings

Tremblay, N., Y. Bouroubi, P. Vigneault, C. Bélec, and Z. Wang. 2007. Responsible decision-support system for crop nitrogen management using remote sensing and geographic information system technologies. P. 80-93. *In* C. Zhao (ed.). *Progress of Information technology in Agriculture. Proceedings of the 4th International Symposium on Intelligent Information Technology in Agriculture (ISIITA)*. October 26-29, 2007, Beijing, China. China Agricultural Science and Technology Press.

Wang, Z., S. Uchida, T. Guo, Y. Wang, and Y. Zhu. 2006. Winter wheat grain yield estimation using remote sensing and GIS. P. 9-22. *In* S. Uchida and O. Koyama. (eds.) *JIRCAS Working Report 50. Proceedings of the Workshop on Japan-China Collaborative Research Project*. Japan International Research Center for Agricultural Sciences (JIRCAS).

Huang, W., J. Wang, L. Liu, Z. Wang, C. Tan, X. Song, and J. Wang. 2005. Study on grain quality forecasting method and indicators by using hyperspectral data in wheat. *Proc. SPIE*, 5655:291-300.

- References will be available on request -
