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Wang, Wen Chung

1961–2018

Associate Vice President (Research and Knowledge Transfer), Chair Professor, and Centre Co-Director, The Education University of Hong Kong

Associate Editor, *British Journal of Mathematical and Statistical Psychology*

Wang, Wen Chung was an eminent psychometrician. He is recognized internationally as a leading scholar in this area for his pioneering contributions to item response theory (IRT) and Rasch measurement. On February 15, 2018, he died of lung cancer. He was 56. He is survived by his wife, Dr. Chen, Hsueh Chu Rebecca, Assistant Professor of the Department of Linguistics and Modern Language Studies at The Education University of Hong Kong (EdUHK), and their daughter and son.

Wang was born in Taiwan where he received his basic and university education. He earned a BS and MEd at National Chengchi University and a PhD at the University of California, Berkeley. After Wang received his PhD in 1994 with a specialty in Quantitative Methods and Evaluation, he returned to Taiwan and was appointed Lecturer at National Taiwan University, where he attained the rank of Associate Professor a year later. In 1996, he joined

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the National Chung Cheng University as Associate Professor. There he became Professor in 2002, Head of the Department of Psychology in 2007, and Distinguished Professor in 2008. In 2008, he was invited to Hong Kong to take up the position of Chair Professor of the Department of Psychology at EdUHK (formerly known as Hong Kong Institute of Education). He was also appointed Director of the Assessment Research Centre from 2009 to 2015, Centre Co-Director from 2015 to 2018 and Associate Vice President (Research and Knowledge Transfer) of EdUHK in 2014. During his tenure, Wang boosted research strength of the Centre and the University in educational and psychological measurement areas, particularly in theoretical development and practical applications of the Rasch model. At the same time, he contributed generously to University governance. He developed the new Rasch-based Student Evaluation of Teaching (SET) system, one of several mechanisms used by the University for continuous improvement of teaching and learning.

Wang will always be remembered for his towering contributions to psychometrics and educational measurement, as well as for his generosity and unfailing commitment to quality education. Wang received a raft of prestigious awards from eminent authorities in the field of psychometrics and measurement, including the conferment as a Fellow of the American Educational Research Association in 2014, and as a Fellow of the Association for Psychological Science in 2017. He was the first recipient of the Lifetime Achievement Award from the Pacific Rim Objective Measurement Society (2018). He was awarded the President's Award for Outstanding Performance in Research from EdUHK in 2016 and 2012, the Outstanding Research Award from the National Science Council of Taiwan

in 2006, a Fullbright Senior Scholarship in 2005, the Excellence in Research Award (Mu-Dou) from Educational Research Association of Taiwan in 2003, and many others. These awards honors Wang as one whom has substantial research accomplishments and has sustained excellent research in the field.

Wang enjoyed a stellar career as Honorary Chair Professor at National Taiwan Normal University, National Sun Yat-sen University, and Beijing Normal University. He served as Associate Editor of the *British Journal of Mathematical and Statistical Psychology* and *Applied Psychological Measurement*. He was also an editorial board member of the *Bulletin of Educational Psychology*, *Chinese Journal of Psychology*, *Psychological Testing*, *International Journal of Testing*, *Journal of Computerized Adaptive Testing*, *Journal of Educational Research and Development*, *Journal of Educational Measurement* (2014–2016), *International Journal of Quantitative Research in Education* (2013–2014), and *Educational and Psychological Measurement* (2006–2010).

Wang's legacy is profound. In collaboration with Mark Wilson and Ray Adams, Wang is credited with developing the first multidimensional Rasch model, which is known as the multidimensional random-coefficients multinomial logit model (MRCMLM; Adams, Wilson, & Wang, 1997; Wang, 1999; Wang, Wilson & Adams, 2000) and is used as blueprint for the computer program that became ConQuest (Wu, Adams, Wilson, & Heldane, 2017). Over the years, Wang published 191 journal articles, seven books, and 15 book chapters on assessment models and theories, their advancement and implications, and secured 31 research projects as principal investigator and 38 research projects as co-investigator. These publications have received

an impressive volume of citations. Wang's several major contributions toward the goal of extending the general Rasch model to many specific models deserve at least brief mention here. (1) He developed new models and advanced existing theories and frameworks (e.g., Wang & Wilson, 2005b); for example, he developed new classes of IRT models for rater errors (Wang & Wilson, 2005a; Wang, Wilson & Shih, 2006), ipsative tests with forced-choice items (Wang, Qiu, Chen, Ro, & Jin, 2017), and examinee-selected items to ensure test fairness (Wang, Jin, Qiu, & Wang, 2012); he advanced cognitive diagnosis models (CDMs) by developing, evaluating, and demonstrating novel models and methods (Wang & Qiu, in press). (2) He built, validated, and adapted various frameworks and scales, such as the Marital Needs Scale, the Principal Instructional Management Rating Scale (PIMRS), the Student Research Experience Questionnaire (SREQ), and the STroke REhabilitation Assessment of Movement (STREAM) Scale for Stroke Patients. (3) He established an assessment system (e.g., Short-Form Functional Assessment System for Stroke Patients) and introduced computerized adaptive testing (CAT) and other information technology features to his research projects.

Wang was an outstanding and passionate teacher. Testament to the impact of his inspiring supervision, Wang's students are recognized researchers in various areas of the extended Rasch family. Many of them have taken up influential positions at major universities in Taiwan, Hong Kong, and Mainland China. Within the short period from 2001 to 2018, Wang graduated 26 PhD and EdD students, for 20 of whom he was the principal supervisor. Students remembered Wang as "an academic giant who allowed us to stand on his shoulders," and his legacy continues.

Wang and his students extended various CAT algorithms with eloquent features, including the implementation of variable-length CAT for CDMs (Hsu, Wang, & Chen, 2013; Hsu & Wang, 2015). Wang's first PhD student, Po-Hsi Chen, formulated an item selection and ability estimation algorithm of multidimensional computerized adaptive testing (MCAT) based on the MRCMLM (Adams, et al., 1997) developed by Wang and his supervisors. This algorithm can be applied to many multidimensional tests, including personality inventory and multiple aptitude tests (Chen, Huang, & Wang, 2008; Wang & Chen, 2004).

In the last decade Wang started his long-term commitment to differential item functioning (DIF) with his students (Shih & Wang, 2009; Su & Wang, 2005; Wang & Shih, 2010; Wang, Shih, & Yang, 2009; Wang & Su, 2004a; 2004b), developing an innovative strategy called DIF-free-then-DIF (Wang, Shih, & Sun, 2012), and demonstrating its usefulness for different types of DIF assessment methods, including the likelihood ratio test method (Wang, et al., 2012), the logistic regression method (Shih, Liu, & Wang, 2014), and differential rater functioning in latent classes (Jin & Wang, 2017). This work continues with a recent simulation study investigating the performance of the DIF-free-then-DIF strategy on assessing non-uniform DIF.

Wang devoted passionate effort and achieved brilliant results on extending the simple Rasch model to address various measurement issues, measurement scale types, and the test behavior of respondents. He was generous in giving his time with both colleagues and students on discovering new knowledge. He guided each of his PhD students to focus on one idiosyncratic characteristic at a time, identify the issue, and then solve the

problem. This dedication yielded impactful new knowledge, including models for randomness in subjective judgments for rating scale items (Wang, Wilson, & Shih, 2006; Wang & Wu, 2011), testlet items (Huang & Wang, 2012), various rater errors (Hung & Wang, 2012; Wang & Liu, 2007; Wang, Su, & Qiu, 2014), multilevel data structures (Wang & Qiu, 2013), higher-order latent traits (Huang & Wang, 2014; Huang, Wang, Chen & Su, 2013), CDMs (Li & Wang, 2015), unfolding models for Likert-type item (Liu & Wang, 2016; Wang & Wu, 2016), response styles (Chen, Jin, & Wang, 2017; Jin & Wang, 2014; Liu & Wang, in press), ipsative items (Wang, et al., 2017), examinee-selected items (Liu & Wang, 2017), and test-takers with inattentive response behavior (Jin, Chen, & Wang, 2018) .

Wang was most admired for his contributions to psychometric theories. To say that Wang laid solid theoretical foundations for CAT, DIF, and multidimensional Rasch is telling only part of the story. Wang was also a pioneer in the application of theoretical work, notably in the fields of medicine and health (Chien, Wang, Lin, Tsai, & Chou, 2012; Hsueh, et al., 2006) and education (Chen, Cheng, Wang, & Hsueh, 2015; Cheng, Wang, & Ho, 2009; Cheng, Wang, Liu, & Chen, 2010). Apart from his research achievements, Wang was dearly remembered as a devoted teacher and research supervisor. We have lost a great colleague and a friend to all.

Mark Wilson, Magdalena M. C. Mok

References

Adams, R. J., Wilson, M., & Wang, W.-C. (1997). The multidimensional

- random coefficients multinomial logit model. *Applied Psychological Measurement*, 21, 1-23. doi:10.1177/0146621697211001.
- Chen, H.-F., Jin, K.-Y., & Wang, W.-C. (2017). Modified logistic regression approaches to eliminating the impact of response styles on differential item functioning detection in Likert-type scales. *Frontiers in Psychology*, 8:1143. doi:10.3389/fpsyg.2017.01143.
- Chen, L.-M., Cheng, Y.-Y., Wang, W.-C., & Hsueh, C.-W. (2015). The intersection between perceived severity and frequency of being bullied: A Rasch measurement approach. *Educational Psychology: An International Journal of Experimental Educational Psychology*, 35, 397–415. doi:10.1080/01443410.2013.864755.
- Cheng, Y.-Y., Wang, W. C., Liu, K. S., & Chen, Y. L. (2010). Effects of association instruction on fourth graders' poetry creativity in Taiwan. *Creativity Research Journal*, 22, 228–235. doi:10.1080/10400419.2010.481542.
- Cheng, Y.-Y., Wang, W.-C., & Ho, Y.-H. (2009). Multidimensional Rasch analysis of a psychological test with multiple subtests: A statistical solution for the bandwidth-fidelity dilemma. *Educational and Psychological Measurement*, 69, 369–388. doi:10.1177/0013164408323241.
- Chien, T.-S., Wang, W.-C., Lin, W.-S., Tsai, L.-S., & Chou, M.-T. (2012). Intraclass reliability for assessing how well Taiwan constrained hospital-provided medical services using statistical process control chart techniques. *BMC Medical Research Methodology*, 12, 67. doi:10.1186/1471-2288-12-67.
- Hsu, C.-L., & Wang, W.-C. (2015). Variable-length computerized adaptive testing using the higher order DINA model. *Journal of Educational*

- Measurement*, 52, 125–143. doi:10.1111/jedm.12069.
- Hsu, C.-L., Wang, W.-C., & Chen, S.-Y. (2013). Variable-length computerized adaptive testing based on cognitive diagnosis models. *Applied Psychological Measurement*, 37, 563–582. doi:10.1177/0146621613488642
- Hsueh, I.-P., Wang, W.-C., Wang, C.-H., Lin, J.-H., Sheu, C.-F., & Hsieh, C.-L. (2006). A simplified stroke rehabilitation assessment of movement instrument. *Physical Therapy*, 86, 936–943. doi:10.1093/ptj/86.7.936
- Huang, H.-Y., & Wang, W.-C. (2012). Higher-order testlet response models for hierarchical latent traits and testlet-based items. *Educational and Psychological Measurement*, 73, 491–511. doi:10.1177/0013164412454431.
- Huang, H.-Y., & Wang, W.-C. (2014). Multilevel higher-order item response theory models. *Educational and Psychological Measurement*, 74, 495–515. doi:10.1177/0013164413509628.
- Huang, H.-Y., Chen, P.-H., & Wang, W.-C. (2012). Computerized adaptive testing using a class of high-order item response theory models. *Applied Psychological Measurement*, 36, 689–706. doi:10.1177/0146621612459552.
- Huang, H.-Y., Wang, W.-C., Chen, P.-H., & Su, C.-M. (2013). Higher-order item response models for hierarchical latent traits. *Applied Psychological Measurement*, 37, 619–637. doi:10.1177/0146621613488819
- Hung, L.-F., & Wang, W.-C. (2012). The generalized multilevel facets model for longitudinal data. *Journal of Educational and Behavioral Statistics*, 37, 231–255. <http://www.jstor.org/stable/41429221>
- Jin, K.-Y. & Wang, W.-C. (2017). Assessment of differential rater functioning in latent classes with new mixture facets models.

- Multivariate Behavioral Research*, 52, 391-402.
doi:10.1080/00273171.2017.1299615.
- Jin, K.-Y., & Wang, W.-C. (2014). Generalized IRT models for extreme response style. *Educational and Psychological Measurement*, 74, 116–138. doi:10.1177/0013164413498876.
- Jin, K.-Y., Chen, H.-F., & Wang, W.-C. (2018). Mixture item response models for inattentive responding behavior. *Organizational Research Methods*, 21, 197–225. doi:10.1177/1094428117725792.
- Liu, C.-W. & Wang, W.-C. (2017). Parameter estimation in Rasch models for examinee-selected items. *Journal of Educational Measurement*, 54, 518–549. doi:10.1111/jedm.12159.
- Liu, C.-W., & Wang, W.-C. (2016). Unfolding IRT models for Likert-type items with a don't know option. *Applied Psychological Measurement*, 40, 517–533. doi:10.1177/0146621616664047.
- Liu, C.-W., & Wang, W.-C. (in press). A general unfolding IRT model for multiple response styles. *Applied Psychological Measurement*.
- Shih, C.-L., Liu, T.-H., & Wang, W.-C. (2014). Controlling Type I error rates in assessing DIF for logistic regression method combined with SIBTEST regression correction procedure and DIF-free-then-DIF strategy. *Educational and Psychological Measurement*, 74, 1018–1048. doi:10.1177/0013164413520545.
- Shih, C.-L., & Wang, W.-C. (2009). Differential item functioning detection using the MIMIC method with a pure short anchor. *Applied Psychological Measurement*, 33, 184–199.
doi:10.1177/0146621608321758.
- Su, Y.-H., & Wang, W.-C. (2005). Efficiency of the Mantel, generalized Mantel-Haenszel, and logistic discriminant function analysis

- methods for detecting differential item functioning for polytomous items. *Applied Measurement in Education*, 18, 313–350.
doi:10.1207/s15324818ame1804_1.
- Wang, W.-C. (1999). Direct estimation of correlations among latent traits within IRT framework. *Methods of Psychological Research Online*, 4, 2, 47-68.
- Wang, W.-C., & Chen, P.-H. (2004). Implementation and measurement efficiency of multidimensional computerized adaptive testing. *Applied Psychological Measurement*, 28, 295-316.
doi:10.1177/0146621604265938
- Wang, W.-C., & Liu, C.-Y. (2007). Formulation and application of the generalized multilevel facets model. *Educational and Psychological Measurement*, 67, 583–605. doi:10.1177/0013164406296974
- Wang, W.-C., & Qiu, X.-L. (2013). A multidimensional and multilevel extension of a random-effect approach to subjective judgment in rating scales. *Multivariate Behavioral Research*, 48, 398–427.
doi:10.1080/00273171.2013.784861
- Wang, W.-C., & Qiu, X.-L. (in press). Multilevel modeling of cognitive diagnostic assessment: The multilevel DINA example. *Applied Psychological Measurement*.
- Wang, W.-C., & Shih, C.-L. (2010). MIMIC methods for assessing differential item functioning in polytomous items. *Applied Psychological Measurement*, 34, 166–180.
doi:10.1177/0146621609355279.
- Wang, W.-C., & Su, Y.-H. (2004a). Effects of average signed area between two item characteristic curves and test purification procedures on the DIF Detection via the Mantel-Haenszel method. *Applied*

Measurement in Education, 17, 113–144.

doi:10.1207/s15324818ame1702_2

- Wang, W.-C., & Su, Y.-H. (2004b). Factors influencing the Mantel and generalized Mantel-Haenszel methods for the assessment of differential item functioning in polytomous items. *Applied Psychological Measurement*, 28, 450–480. doi:10.1177/0146621604269792
- Wang, W.-C., & Wilson, M. (2005a). Exploring local item dependence using a random-effects facet model. *Applied Psychological Measurement*, 29, 296–318.
- Wang, W.-C., & Wilson, M. (2005b). The Rasch testlet model. *Applied Psychological Measurement*, 29, 126–149.
- Wang, W.-C., Wilson, M., & Adams, R. J. (2000). Interpreting the parameters of a multidimensional Rasch model. In M. Wilson & G. Engelhard (Eds.), *Objective measurement: Theory into practice*. (Vol. 5, pp. 219–242). Norwood, NJ: Ablex.
- Wang, W.-C., Wilson, M., & Shih, C.-L. (2006). Modeling randomness in judging rating scales with a random-effects rating scale model. *Journal of Educational Measurement*, 43, 335–353.
- Wang, W.-C., & Wu, S.-L. (2011). The random-effect generalized rating scale model. *Journal of Educational Measurement*, 48, 441–456. doi:10.1111/j.1745-3984.2011.00154.x.
- Wang, W.-C., & Wu, S.-L. (2016). Confirmatory multidimensional IRT unfolding models for graded-response items. *Applied Psychological Measurement*, 40, 56–72. doi:10.1177/0146621615602855.
- Wang, W.-C., Jin, K.-Y., Qiu, X.-L., & Wang, L. (2012). Item response models for examinee-selected items. *Journal of Educational*

- Measurement*, 49, 419-445. doi:10.1111/j.1745-3984.2012.00184.x
- Wang, W.-C., Qiu, X.-L., Chen, C.-W., Ro, S., & Jin, K.-Y. (2017). Item response theory models for ipsative tests with multidimensional pairwise-comparison items. *Applied Psychological Measurement*, 41, 600–613. doi:10.1177/0146621617703183.
- Wang, W.-C., Shih, C.-L., & Sun, G.-W. (2012). The DIF-free-then-DIF strategy for the assessment of differential item functioning. *Educational and Psychological Measurement*, 72, 687–708. doi:10.1177/0013164411426157
- Wang, W.-C., Shih, C.-L., & Yang, C.-C. (2009). The MIMIC method with scale purification for detecting differential item functioning. *Educational and Psychological Measurement*, 69, 713–731. doi:10.1177/0013164409332228
- Wang, W.-C., Su, C.-M., & Qiu, X.-L. (2014). Item response models for local dependence among multiple ratings. *Journal of Educational Measurement*, 51, 260–280. doi:10.1111/jedm.12045.
- Wang, W.-C., Wilson, M., & Shih, C.-L. (2006). Modeling randomness in judging rating scales with a random-effects rating scale model. *Journal of Educational Measurement*, 43, 335-353. doi:10.1111/j.1745-3984.2006.00020.x
- Wu, M. L., Adams, R. J., Wilson, M. R., & Heldane, S.A. (2017). ACER ConQuest: Generalized item response modeling software (Version 2.0) [computer software]. Melbourne: Australian Council for Educational Research.