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# Mathematics Professor's Publications Add Up

Kim Hill
*Illinois Wesleyan University*

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Professor of Mathematics Tian-Xiao He

BLOOMINGTON, Ill. – Illinois Wesleyan University mathematics professor Tian-Xiao He says reaching the number "100" is not significant. Colleagues beg to differ.

The topic under debate is not the numeral following "99" but rather the number of papers published in peer-reviewed mathematics journals that He has written or co-authored. To be precise (this is mathematics, after all), He has published more than 100 papers and five books since his graduate school days in the 1980s.

"That's a very, very heavy publication rate you don't often find, even at major research institutions," said Melvyn Jeter, chair of Illinois Wesleyan's mathematics department.

He acknowledges his prolific publication record but said teaching is his real passion.

"Teaching is not only my duty, my job, my vocation but also my delight," said He. The longtime Wesleyan faculty member said his research and his teaching support and complement each other.

"I think my research experience helps my teaching a lot," He said. "Teaching math is basically teaching how to think about math creatively, such as raising questions and finding ways to solve them, which is exactly what we need in research."

Conversely, He said his varied research interests – approximation theory, wavelet analysis, spline theory and enumerative combinatorics, among others – have connections. "Thinking about a problem in one field may lead to solving a problem in another field," He explains. "Plus, I am working on several problems at the same time. If I feel difficulty on one question, I move on to another problem.

"A cornerstone idea for mathematics is taking a math problem to big and different spaces," he added. "I am working in several fields, which allows me to consider a problem from different aspects. A hard problem in one space might be solved readily in another space by using a different view. In addition, I like what (Sir Michael) Atiyah (British mathematician) said, 'The length of the time you can go on being active within mathematics very much depends on the width of your coverage.' I believe that to diversify in different fields gives researchers broad coverage, which brings them more perspective and interaction in their math research."

He's research interests include approximation theory, numerical analysis, wavelet analysis, multivariate splines, number theory, theory of functions, enumerative combinatorics and combinatorial analysis. His undergraduate course on wavelet analysis at Illinois Wesleyan was among the first at any college or university.

"This was in 1994 and I could not find any text on wavelet analysis for the undergraduate class," He recalled. "My own graduate course notes were too difficult, as my advisor at Texas A&M was a founder of wavelet analysis. So, I had to develop my own text."

Asking which He enjoys most – teaching or researching – is like asking a father which of his children is his favorite. For He, his joy is in the outcome, no matter the activity. “In teaching, I most enjoy the immediate reaction, when I can’t make my sentence complete before the questions begin,” He explains. “In research, being stuck on a problem and then finding a simpler way to do the work, that is very enjoyable, too.”

He the teacher is never far away from He the researcher. “When I am writing a paper or book, I envision a student behind me looking over my shoulder to read my words and asking, ‘Professor, what does this mean?’ ”

*Contact: Kim Hill, (309) 556-3960*