AUTHOR COMMENTARIES - 2009

December 2009

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Kin-Lu Wong

Featured Scientist Interview

According to a recent analysis of Essential Science Indicators℠ *from Thomson Reuters, the work of Dr. Kin-Lu Wong had the highest percent increase in total citations in the field of Engineering. Dr. Wong's current record in this field includes 71 papers cited a total of 979 times between January 1, 1999 and August 31, 2009.*

Dr. Wong is the Sun Yat-Sen Chair Professor of the Electrical Engineering Department at the National Sun Yat-Sen University in Kaohsiung, Taiwan, where he also serves as the Vice President for Academic Affairs. He is also an IEEE Fellow and a Distinguished Research Fellow of the National Science Council.

In the interview below,* ScienceWatch.com *talks with Dr. Wong about his highly cited work.

SW: Please tell us a bit about your educational background and research experience—particularly what drew you to your current field.

I received my B.S. degree in electrical engineering from National Taiwan University, Taiwan, and my M.S. and Ph.D. degrees in electrical engineering from Texas Tech University, Lubbock, Texas, USA, in 1981, 1984, and 1986, respectively.

From 1986 to 1987, I was a visiting scientist with Max-Planck-Institute for Plasma Physics in Munich, Germany. Since 1987 I have been with the Department of Electrical Engineering, National Sun Yat-Sen University (NSYSU), Kaohsiung, Taiwan, where I became a Professor in 1991. From 1998 to 1999, I was a Visiting Scholar with the ElectroScience Laboratory, The Ohio State University, Columbus, Ohio, USA.

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My graduate students.

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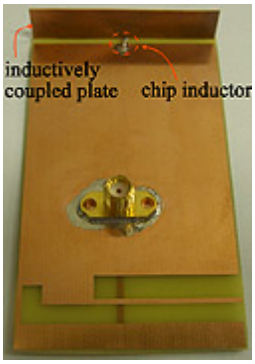
In 2005, I was elected to be the Sun Yat-Sen Chair Professor of NSYSU, the highest honor in NSYSU. I also served as Chairman of the Electrical Engineering Department from 1994 to 1997, Dean of the Office of Research Affairs from 2005 to 2008, and now as Vice President for Academic Affairs, NSYSU (2007~).

I have published more than 450 refereed journal papers and 230 conference articles and has personally supervised 47 graduated Ph.D.s. I also hold over 100 patents, including U.S., Taiwan, China, Korean, and European patents, and have many other patents pending. I am the author of *Design of Nonplanar Microstrip Antennas and Transmission Lines* (New York: Wiley,

1999), *Compact and Broadband Microstrip Antennas* (New York: Wiley, 2002), and *Planar Antennas for Wireless Communications* (New York: Wiley, 2003).

In 2008, the research achievements of *Handheld Wireless Communication Devices Antenna Design* of the NSYSU Antenna Lab, which I led, were selected to be one of the top 50 scientific achievements of the National Science Council of Taiwan in past 50 years (1959~2009).

I am an IEEE Fellow and received the Outstanding Research Award three times from the National Science Council of Taiwan in 1994, 2000 and 2002, and was elevated to be a Distinguished Research Fellow of National Science Council in 2005.



internal WWAN antenna applied to a mobile phone with a short ground plane

I started my current research on small and wideband antennas for mobile communication devices, such as the handset and laptop computers, in 1999. At that time, mobile communications had started to boom and the internal antennas for applications in the mobile communication devices were becoming a very important design issue for achieving good communication qualities. The communications industry is also in great demand in new internal mobile device antennas with small size and wideband operation. This draws me to my current research field on the small and wideband internal mobile device antenna design.

SW: One of your most-cited papers is the 2003 *IEEE T. Antenn. Propag*. paper, "Printed double-T monopole antenna for 2.4/5.2 GHz dual-band WLAN operations," (Kuo YL, Wong KL, 51[9]: 2187-92, September 2003). Would you talk a bit about this study—what you set out to find, what the results were, and why the paper is significant?

This paper reports a simple printed antenna for dual-band WLAN operation. The proposed antenna is easy to fabricate and has a low profile for mobile device applications. In addition, this study reports the important effects of varying the antenna dimensions for achieving widened bandwidth. The ground plane effects on the antenna performances are also studied, which leads to the important conclusion that the ground plane effects on the antenna performances should be taken into consideration in the mobile device antenna design.

SW: Another of your highly cited papers is a 2005 paper in the same journal, "Ultrawide-band square planar metal-plate monopole antenna with a trident-shaped feeding strip," (Wong KL, Wu CH, Su SW, 53[4]: 1262-9, April 2005)—would you talk a bit about this paper?

This paper reports an ultra-wideband (UWB) antenna that shows good vertical polarization purity over the obtained UWB band. The polarization purity is important to achieve good communication quality in the UWB communications. This paper is among the very few studies that report promising solutions to achieve good polarization purity for frequencies over a very wide bandwidth of larger than 10 GHz.

"Small size and wideband operation are the most demanding design issue for the internal mobile device antenna, although small size and wideband operation are usually in conflict."

SW: More recently, you published another paper in this journal, "Multiband printed monopole slot antenna for WWAN operation in the laptop computer," (Wong KL, Lee LC, 57[2]: 324-30, February 2009). Would you tell our readers a little about this research?

This paper reports an all-printing internal laptop computer antenna which shows small size and wideband operation covering GSM850/900/1800/1900/UMTS bands. This antenna is especially suitable for the thin-profile laptop computer applications. This reported antenna is the first one in using the monopole slot elements for achieving WWAN operation in the laptop computer. It demonstrates that the monopole slot element can be applied in the laptop computer as an internal antenna. This leads to more flexibility in designing the internal laptop computer antennas.

SW: What would you say is the most challenging aspects of your work? The most rewarding?

The most challenging aspect of my study is to achieve an antenna with a smaller size yet wider operating band. Small size and wideband operation are the most demanding design issue for the internal mobile device antenna, although small size and wideband operation are usually in conflict. And the most rewarding is that some of our antenna designs have been applied in practical handsets and laptop computers. Also, our graduated students are very welcomed in the industry, and every one of them received good job offers before their graduation.

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Kin-Lu Wong's current most-cited paper in *Essential Science Indicators*, with 84 cites:

Kuo YL, Wong KL, "Printed double-T monopole antenna for 2.4/5.2 GHz dual-band WLAN operations," *IEEE Trans. Antennas Propagat*. 51(9): 2187-92, September 2003. Source: *Essential Science Indicators* from Thomson Reuters.

KEYWORDS: SMALL ANTENNAS, WIDEBAND ANTENNAS, MOBILE COMMUNICATION DEVICES, INTERNAL ANTENNAS, WLAN, ANTENNA DESIGN, GROUND PLANE EFFECTS, UWB ANTENNA, POLARIZATION PURITY, MONOPOLE SLOT ELEMENTS, LAPTOP COMPUTERS.

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