



黄瑞彬

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## **Autobiography**

Ruey-Bing (Raybeam) Hwang earned his B.S. at department of Communications Engineering, National Chiao-Tung University in 1990, and M.S. at department of Electrical Engineering, National Taiwan University in 1992. He received the Ph. D. degree in Institute of Electronic Engineering, National Chiao-Tung University in 1996. From August 2004 to July 2005, he was an Assistant Professor at the Communication Engineering department, National Chiao-Tung University. He became a professor of electrical engineering in August 2008. In August 2013, he was appointed Director of the Institute of Communications Engineering, which is affiliated with the ECE department.

Prof. Hwang has authored or co-authored over 80 journal and international conference papers in the area of microwaves, optics and applied physics. Additionally, he authored a book entitled “*Periodic Structures: Mode-Matching Approach and Applications in Electromagnetic Engineering*”, published by Wiley-IEEE Press, October 2012. His research interests include phased array technology, FMCW radar system, beam adaptive antennas design, electromagnetic theory, and photonic crystals.

In August 2012, he got a one-year research grant from MG+4C to develop an intelligent frequency-modulated continuous wave (FMCW) radar system based on the smart antenna technology. Such a radar system equipped with 8 transceivers and antennas array. It consists of two key features, one is the direction-of-arrival (DoA) estimation, and the other is the beamforming technique. For the receiving mode, the echo signals received by the antennas were directly down converted to intermediate frequency and processed using the multiple signal classification (MUSIC) algorithm incorporating the spatial smoothing technique for predicting the direction of the incoming plane waves. Once the directions of arrival were obtained, the high-gain beam pattern pointing to each target will be synthesized by assigning the appropriate phase distribution over the stable local oscillators array. The range and speed of the moving (or stationary) target then be determined by the beating frequency between the transmitted and echo FMCW signals. Specifically, we exploited the same technology for developing a X-band data transmission system (50MHz bandwidth, centered at 9410MHz) having the functions of DoA and beamforming. Through the experimental studies conducted in Chiao-Tung University, it is interesting to note that it can dynamically track the signal emitted by a moving target. Simultaneously, the high-gain and narrow beam-width pattern is generated by the beam-forming system for enhance the signal-to-noise ratio over the receiver.

## **Education**

6/1996 National Chiao-Tung University, Taiwan, R.O.C. Ph. D. (Institute of Electronics)

6/1992 National Taiwan University, Taiwan, R.O.C. M. S. (Department of Electrical Engineering)

6/1990 National Chiao-Tung University, Taiwan, R.O.C. B. S. (Department of Communication Engineering)

## **Experience**

- 8/2013 ~: Director of Graduate Institute of Communication Engineering, Chiao-Tung University
- 2/2013 ~ 7/2013: Division head of Research and Planning Division, NCTU Office of Research and Development, Chiao-Tung University
- 8/2008 ~ current: Professor, Department of Electrical Engineering, Chiao-Tung University
- 8/2005 ~ 7/2008: Associate Professor, Department of Communication Engineering, National Chiao-Tung University
- 8/2004 ~ 7/2005: Assistant Professor, Department of Communication Engineering, National Chiao-Tung University
- 10/2000 ~ 12/2002: Research Associate Professor, Microelectronics Research Center, National Chiao-Tung University
- 10/1996 ~ 10/2000: Associate Researcher, High performance Computing Center, National Science Council

## **Research Area**

Periodic Structures (Photonic crystals), FMCW Radar system, Phased Array Technology, Antennas and array antennas design

## **Professional activity**

- Editor-in-Chief: Universal Journal of Electrical and Electronic Engineering, Horizon Research, 2013~
- Board of Editors: Advanced Electromagnetics, 2013~
- Editorial Advisory Board Member of Recent Patents on Telecommunications: BENTHAM SCIENCE
- 2007 IEEE International Workshop on Anti-counterfeiting Security and Identification, Xiamen, China, April 16–18, 2007, international advisory committee
- 2007 IEEE Electrical Design of Advanced Packaging and Systems, Taipei, Taiwan, R.O.C., December 16-17, technical program committee
- ISAP 2008, the International Symposium on Antennas and Propagation, Taiwan in October, 27-30, 2008, vice chair of the technical program committee
- 2008 International EMC Workshop, Taipei, Taiwan, R.O.C., October, 2008, invited speaker and member of technical program committee
- 2010 META'10, 2<sup>nd</sup> International Conference on Metamaterials, Photonic Crystals and Plasmonics, 22-25, February, 2010, Cairo-Egypt, member of technical program committee

- PIERS 2010 in Xian, session organizer and chairperson
- APEMC 2010, Beijing, China, TPC member and session chairperson
- AEM2C, 2011, Taipei, Taiwan, TPC member and session chairperson
- 7-th Asia-Pacific International Conference, 1-4, Nov. 2011, Chengdu, China, TPC member
- 2013 Asia-Pacific Radio Science conference, Taipei, Taiwan, session convener
- PIERS 2013 in Taiwan, TPC member

### **Position Statement**

Most of the researchers in the field of electromagnetics, more or less, have some experiences in antenna design. I believed that IEEE Transactions on Antennas and Propagation is the first journal where Taiwan's scholars make a miracle on paper publication. With the profound research capacity and well-established manufacturing experiences, we are in a good position for putting ourselves on the map. If elected, I will bridge the gap between the academy and industry through intensive cooperation. The on-site or on-line interactive forum will be held for encouraging the involvement of young scholars coming from industrial and academic sectors.