REN, Quansheng is an associate professor in the Department of Electronics, School of EECS. He obtained his B.Sc. from Peking University in 2003, and Ph.D. from Peking University in 2008 respectively. He finished his postdoc research in Max Planck Institute for Mathematics in the Sciences in 2010. His research interests include neuromorphic engineering, photonic neuromorphic system, learning dynamics, and electromagnetic & quantum biology.

Dr. Ren has published about 30 research papers, and most of them are published in international journals and conferences, such as Optics Express, Physical Review E, Applied Physics Letters, Applied Optics, IEEE Journal of Quantum Electronics, Europhysics Letters, CLEO, ISNN and IJCNN. He is serving as a Review Editor of Frontiers in Neuromorphic Engineering.

Dr. Ren has several research projects in these related fields including NSFC projects. His research achievements are summarized as follows:

1) Neuromorphic system with deep learning architecture implemented on FPGA: One major research topic in neuromorphic field is to combining deep learning architecture with neuromorphic engineering to handle spiking inputs from neuromorphic sensors. He proposed several new techniques to implemented neuromorphic system with convolutional neural network architecture on Xilinx Ultrascale FPGA, so that the system can process the spiking signal from the neuromorphic retina-like camera chip designed by School of EECS at PKU.
2) Learning and computing architecture in photonic neuromorphic system: He led the earliest research project in China in the field of photonic neuromorphic systems, and achieved several achievements. He proposed the optical spike-timing-dependent plasticity (STDP) with local and global feedback signals to achieve weight-dependent learning window and reward-based reinforcement learning. A mechanism of optical spike timing dependent delay plasticity (STDDP) was proposed to realize the learning and recognition of optical spatio-temporal spike patterns. He also proposed the method to implement the Neural Engineering Framework (NEF) on a scalable optoelectronic architecture which can run about six orders of magnitude faster than electronic counterparts.
3) The self-organization process of neural networks: He found the motif profile of STDP-driven network has robust qualitative similarities with the real neural network of *C. elegans*. Then, he studied the effect of learning dynamics on neuronal network from many different aspects, such as synchronization, topology, information, dynamics, and deep learning etc.
4) Electromagnetic & quantum biology: In this field, he is focusing on the central role of water for biology, and especially, the effects of EM & spintronics quantum process on the exclusion-zone (EZ) water near hydrophilic surfaces such as neuron membrane. He studied the effects of spin magnetic moment on the formation process of EZ. Their experimental results have novel implications for EM & quantum biology.