



Hao Zhang

- Chinese National
- Received his doctorate in electrical engineering from USC in 2006
- Age 41 at time of sentencing
- Professor at Tianjin University, a premier technical school in China



CDSE

Center for Development
of Security Excellence

CASE STUDY

Economic Espionage

WHAT HAPPENED

Hao Zhang and Wei Pang met while attending the University of Southern California (USC). In 2006, Zhang graduated with a PhD. and took a job at Skyworks Solution, Inc. as a semiconductor engineer. Skyworks is an innovator of high-performance analog semiconductors headquartered in Woburn, Massachusetts. His co-conspirator, Wei Pang, started working at Avago Technologies, Inc. in Palo Alto, California. Avago is a designer, developer, and global supplier of a broad range of analog, digital, mixed signal, and optoelectronics components and subsystems with a focus in semiconductor design and processing.

By October 2006, Zhang and Pang were planning to start a business in China to compete with both Avago and Skyworks. While working at Skyworks, Zhang stole trade secrets relating to Surface Acoustic Wave ("SAW") and Bulk Acoustic Wave ("BAW") filters, including Film Bulk Acoustic Resonators ("FBAR"), a type of BAW filter. These filters are commonly used as radio frequency ("RF") filters for mobile phones and other devices for consumer and military applications.

Zhang and Pang shared trade secrets with each other and with co-conspirators in China while they worked for U.S. companies. In 2009, Zhang and Pang obtained professorships at Tianjin University (TJU) based on their academic and professional experience and their commitment to start a Micro-Electro-Mechanical Systems ("MEMS") lab at the university. TJU was aware of the trade secrets the defendants brought with them.

With guidance from TJU, Zhang and Pang filed Chinese patent requests and created a shell company in the Cayman Islands they called Novana. Novana and a TJU subsidiary called Tianjin Micro Nano Manufacturing Tech (MNMT) created the new company, ROFS Microsystems (ROFS), as a joint venture to manufacture product realized from use of the trade secrets. Along the way, Zhang also obtained U.S. patents in his own name using trade secret information he knew was stolen from Avago.

INDICATORS

Foreign Considerations – Zhang came to the United States from China as a graduate student at USC in May 2003. After obtaining his PhD in Electrical Engineering from USC in 2006, he returned to China to open his own company. He soon moved back to the U.S. to work for Skyworks Solutions, Inc. Zhang had frequent, on-going contact with numerous Chinese nationals including Jinping Chen, Assistant Dean at TJU and the Deputy General Manager/Vice President of MNMT, Zhao Gang, who helped them form MNMT, and Chong Zou, an undergraduate student at TJU who was working for Zhang and Pang.

IMPACT

- Zhang was convicted in a four-day bench trial on one count of conspiracy to commit Economic Espionage, one count of conspiracy to commit theft of trade secrets, 12 counts of Economic Espionage and aid and abetting, and 12 counts of theft of trade secrets and aiding and abetting.
- In September 2020, Zhang was sentenced to 18 months in prison and ordered to pay \$476,835 in restitution
- The technology that Zhang and his co-conspirators stole took over 20 years of research and development to build.

ADDITIONAL INFO

- Security experts noted that if a security clearance were required before his employment, a simple background check would show Zhang owned a foreign business in direct competition with Skyworks.
- The objective of the conspiracy was to steal trade secrets from Avago and Skyworks and use them to set up an FBAR/BAW fabrication facility in China. In effect, and in the words of one of the defendants, the objective was "moving Avago to China."
- To accomplish this transfer, Zhang and Pang communicated with individuals in China to disguise the sources and origins of the trade secrets stolen from Avago and Skyworks. China would then use the technology contained within those trade secrets to develop products for civilian and military use.
- Avago's FBAR technology contained trade secrets, as defined in Title 18, United States Code, Section 1839(3), used to develop products sold worldwide. Avago and its predecessor companies spent approximately 20 years and \$50,000,000 researching and developing its FBAR technology.
- Zhang was sentenced to a three-year period of supervised release and ordered to pay restitution to Avago and Skyworks. He consented to the court-ordered forfeiture of the U.S. patents obtained with stolen Avago technology.

Questions to Consider:

- What protections does your organization have to safeguard against Economic Espionage?
- What key elements should be included when reporting a potential case of Economic Espionage? And to whom?

Resources for further exploration:

- **FBI Economic Espionage National Awareness Campaign:** <https://www.fbi.gov/news/stories/economic-espionage>
- **Security Chat with Acting Chief of FBI Economic Espionage Unit**
(<https://cdse.acms.com/pb64vc1982xj/>)
- **Foreign Economic Espionage in Cyberspace:**
(<https://www.dni.gov/files/NCSC/documents/supplychain/20190327-economic-espionage-pub02.pdf>)

IF YOU SEE SOMETHING, SAY SOMETHING!

Contact the appropriate POC to report any observed potential risk indicators:

Name: _____ Agency/Department: _____
Title: Supervisor/Security Officer/ITP Senior Official/ITP Manager