

# Dr. Xiao-Ping (Steven) Zhang

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## [Postdoc Positions Available Now \(NEW Update!\)](#)

## • [Short Biography](#)

## • Research Interests

My area of interest is signal/information processing and machine learning based theoretical and application research. Currently, my specific interests include the following aspects:

- Multimedia Signal/Content Processing and Big Data Analytics
  - My current multimedia research focuses not only on traditional image/video problems, such as object segmentation and extraction and noise suppression, but also on multimedia content processing including the statistical model based/content-based video and image analysis, digital watermarking, data hiding, content-based information retrieval (CBIR), and e-commerce applications. Multimedia communication is an emerging application in which signal processing and communications are pertinent. With the rapid development of broadband, Internet, and the exponential increase of multimedia content online, multimedia content analysis and processing are critical to further improvement. We would like to develop new techniques and theories not only to address traditional multimedia communication issues but more to address research problems in video/image/audio content analysis applications using signal processing, statistical modeling and machine learning methods.
- Signal/Information Processing for Finance, Economics and Marketing
  - I have extended my research to the areas of finance, economics and marketing. The Chicago school of economics maintains that a free market can optimally allocate resources and correctly price assets most of the time. The end of the cold war and the rapid development of emerging economies like China are prime examples of market power. A free market operates as a powerful distributed information processor – people and markets in aggregate can accurately and promptly process information. While economists often take efficient information processing for granted, my goal as a

researcher is to determine the rationale for these phenomena and develop information processing tools to analyze the massive amount of digital information in the financial market. Intrigued by the information processing power of the free market and impressed by the world-class thinkers at [the University of Chicago Booth School of Business](#), I took my sabbatical there in 2006-2008.

- Signal Processing for Sensor Networks

- Modern digital communication systems and sensor networks demand advanced detection/estimation, tracking and data fusion techniques. My research is to use the signal processing and machine learning algorithms to solve specific problems in sensor networks, radar systems and communication systems. We are developing novel data fusion and target tracking methods based on statistical filtering in radar and sensor networks.

- Wavelets, Filterbanks and Time-Frequency/Time-Scale Analysis

- For over two decades, the use of wavelet transforms (WT) has been ubiquitous in signal processing due to the power of its flexible time-frequency resolution and the existence of fast algorithms. It has become a better alternative to traditional Fourier analysis especially for non-stationary, time-varying signals. In many applications, the signal in the wavelet domain has exhibited good statistical properties. My objective is to exploit these properties and design innovative algorithms as efficient and effective features to solve specific application problems.

- [Selected Publications and Patents](#) (Some e-prints available.)

- **(NEW!)** My perspective article on AI for Finance: “[To the Victor Go the Spoils: AI in Financial Markets](#),” *IEEE Signal Processing Magazine*, November 2017.

- **(NEW!)** Tutorial: “[Signal Processing for Finance, Economics, and Marketing](#),” *IEEE Signal Processing Magazine*. [\[PDF\]](#)

- Conference Organization

- **(NEW!)** General Co-Chair, the 46th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2021), Toronto, Canada (Mark your calendar!)
- **(NEW!)** [General Co-Chair, 2017 GlobalSIP Symposium on Signal and Information Processing for Finance and Business, November 14-16, 2017, Montreal, Canada](#)
- [General Chair, IEEE International Workshop on Multimedia Signal Processing - MMSP2015](#)

- [Tutorial in IJCNN2017: Graphical Probabilistic Modeling and Machine Learning for Multimedia Content Analysis](#)



- [\*\*Tutorial in ICASSP2014: Signal Processing for Finance, Economics and Marketing Modeling and Information Processing\*\*](#)
- **Editorship**
  - Senior Area Editor, [IEEE Transactions on Signal Processing](#)
  - Associate Editor, [IEEE Transactions on Image Processing](#)
  - Associate Editor, [IEEE Transactions on Multimedia](#)
  - Associate Editor, [IEEE Transactions on Circuits and Systems for Video Technology](#)
  - Associate Editor, [IEEE Signal Processing Letters](#)
- [\*\*Research Lab -- Communications and Signal Processing Applications Lab \(CASPAL\)\*\*](#)
- [\*\*Teaching\*\*](#)
- **Entrepreneur**
  - [EidoSearch.com](#)
- [\*\*Lifestyle Activities \(Running, Sports, and Arts\)\*\*](#)
- Please contact me if you are **self-motivated** and wish to do your graduate study with me.
  - Please read [this FAQ](#) carefully before you contact me.