

# Yi-Chen Zhang

## Contact Information

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## Education

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**Ph.D., Department of Statistics and Probability** Aug. 2013 - Jun. 2018  
Michigan State University, East Lansing, MI  
Advisor: Dr. Lyudmila Sakhanenko  
Dissertation: Functional Data Analysis with Application to Traffic Flow Data

**M.S., Graduate Institute of Statistics** Sep. 2007 - Jun. 2009  
National Central University, Taiwan  
Advisor: Dr. Tsai-Hung Fan  
Thesis: Bayesian Model Selection in Linear Mixed Effects Models with AR(1) Errors

**B.S., Department of Mathematics** Sep. 2003 - Jun. 2007  
National Central University, Taiwan

## Work Experience

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**Algorithm Engineer - APTIV** Jul. 2018 - Present  
- Mainly develop the fusion algorithm for Fused Road Model  
- Work on the track object data and design the modeling algorithm  
- Give numerical methods of statistical lectures  
- Mainly develop the Object Trails & Processing (OP&T) library  
- Develop a prediction and cost function based algorithm to perform cooperative social behavior.

**Research Assistant** Jan. 2016 - Dec. 2016  
Computational Mathematics, Science and Engineering, Michigan State University  
Supervisor: Dr. Yuying Xie and Dr. Mark Reimers  
- Work in neuroimaging data, including movement correction, denosing, registration, and Fourier analysis

**Research Assistant** Aug. 2010 - Jul. 2013  
Institute of Statistical Science, Academia Sinica  
Supervisor: Dr. Jeng-Min Chiou  
- Research in functional data, including functional clustering, functional linear model, functional prediction, and missing value imputation and outlier detection  
- Programming assistant (Chiou, J.-M., Annals of Applied Statistics, 2012)

**Corporal** Aug. 2009 - Aug. 2010  
Military Service, Beigan Township, Lienchiang County, Taiwan

**Network Administrator** Jul. 2007 - Jun. 2009  
Graduate Institute of Statistics, National Central University  
- Manage and maintain e-mail server based on FreeBSD operating system  
- Design an alumni website for graduate alumnus  
- Maintenance and elimination of common breakdown of the PCs in computer laboratory

**Network Administrator** Feb. 2005 - Jun. 2007  
Mathematics Computation Laboratory, National Central University

- Manage e-mail server and design some rules to block spam mail
- Design a network sync upgrade system of more than 80 computers over 2 classrooms
- Devise a web-based roll call and sign in system

### Network Assistant

Feb. 2004 - Jan. 2005

Mathematics Computation Laboratory, National Central University

- Provide software support and computer consulting for freshmen
- Supervise the network and do system analysis and trouble shooting

## Teaching Experience

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Year	Semester	Role	Course number with title
2018	Spring	TA	STT 231 Statistics for Scientists
2017	Fall	TA	STT 200 Statistical Methods
		GA	STT 873 Statistical Learning and Data Mining
	Spring	TA	STT 315 Introduction to Probability and Statistics for Business
2016	Fall	RA*	STT 442 Probability and Statistics II: Statistics
			STT 861 Theory of Probability and Statistics I
2015	Fall	TA	STT 200 Statistical Methods
	Summer	Instructor	STT 200 Statistical Methods
	Spring	TA	STT 224 Introduction to Probability and Statistics for Ecologists
2014	Fall	GA	STT 863 Statistical Methods I
			STT 886 Stochastic Processes and Applications
	Summer	GA	STT 421 Statistics I
			STT 430 Introduction to Probability and Statistics
	Spring	GA	STT 351 Probability and Statistics for Engineering
			STT 430 Introduction to Probability and Statistics
2013	Fall	GA	STT 441 Probability and Statistics I: Probability

\*: Sporadically acted as teaching substitute.

## Publications

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1. **Zhang, Y.-C.** and Sakhanenko, L. (2020+). *Road Geometry Estimation Using Vehicle Trails: A Linear Mixed Model Approach*. (In preparation)
2. **Zhang, Y.-C.** (2020+). *Dynamical Highway Vehicle Lane Classification Using Vehicle Trails*. (In preparation)
3. **Zhang, Y.-C.** and Sakhanenko, L. (2019). *The Naive Bayes Classifier for Functional Data*. *Statistics & Probability Letter* **152**, 137-146.
4. Chiou, J.-M., **Zhang, Y.-C.**, Chen, W.-H., and Chang, C.-W. (2014). *A Functional Data Approach to Missing Value Imputation and Outlier Detection for Traffic Flow Rate Data*. *Transportmetrica B: Transport Dynamics* **2**, 106-129.
5. Fan, T.-H., Wang, Y.-F., and **Zhang, Y.-C.** (2014). *Bayesian Model Selection in Linear Mixed Effects Models with AR(1) Errors Using Mixture Priors*. *Journal of Applied Statistics* **41**, 1814-1829.

## Referee Service

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- Biometrics

## Honors/Awards

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- College of Natural Science Dissertation Continuation Fellowship Summer 2017, Michigan State University.
- College of Natural Science Dissertation Completion Fellowship Summer 2018, Michigan State University.

## Computer Skills

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- Advanced knowledge in C/C++.
- Experienced in using mathematics and statistics software including MATLAB and R.
- Ability to use C/C++ under R and MATLAB to carry out secondary development.
- Extensive experience of using Linux system with a focus on Ubuntu.
- Strong knowledge of Linux/Unix environment and commends.
- Knowledgeable to write shell scripts such as Perl to automate tasks.
- Understanding and experience to work with parallel computing API such as openMP and MPI.
- Experience with high performance cluster computer (HPCC) such as Torque and SLURM.
- Proficient in  $\text{\LaTeX}$  for document preparation and  $\text{\TiX}$  for producing vector graphics.
- Fluent with version control tools such as git (gitlab and gerrit), Subversion (SVN), and Plastic SCM.
- Working knowledge of structure query language such as MySQL.
- Working knowledge of Robot Operating System (ROS).

## Software Packages

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- **Autologistic-Models:** An R package implemented in C++. The objective of this program is to reduce the estimating bias of parameters when fitting autologistic models.
- **Modified-Rainbow:** A modified version of rainbow package in R that uses the functional principal component instead of the robust principal component.
- **Parallel-Kernel:** The kernel density estimation implemented in C++ and paralleled via OpenMP.
- **MCEM:** An R package that realizes the Implementation of the Monte Carlo EM Algorithm, Richard A. Levine and George Casella (2001)
- All above packages are available on my GitHub.