

# Sayar Karmakar

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(Current) Ph.D. candidate in Statistics, University of Chicago, (Expected June 2018)

Master of Statistics, Indian Statistical Institute, 2013.

Bachelor of Statistics, Indian Statistical Institute, 2011.

## Publications

### *Submitted Journal Articles*

1. Bahadur representation and simultaneous confidence bands of time-varying models:(2017) **Sayar Karmakar**, Stefan Richter, Wei Biao Wu; Under revision in *Annals of Statistics*.  
Link: <https://sayarkarmakar.github.io/publications/sayar1.pdf>
2. Optimal Gaussian approximation under dependence:(2017) **Sayar Karmakar**, Wei Biao Wu; Under revision in *Statistica Sinica*  
Link: <https://sayarkarmakar.github.io/publications/sayar2.pdf>
3. Long term prediction intervals of economic time-series:(2017) Marek Chudy\*, **Sayar Karmakar\***, Wei Biao Wu; Under revision in *Journal of Forecasting* [\* equal contribution]  
Link: <https://sayarkarmakar.github.io/publications/sayar3.pdf>

### *Journal Articles in Preparation*

1. Prediction intervals for high dimensional regression: Sayar Karmakar, Marek Chudy, Wei Biao Wu;  
Manuscript: <https://sayarkarmakar.github.io/publications/sayar4.pdf>
2. Detection and test of synchronization of change-points in multiple time-series: Sayar Karmakar, Maggie Cheng, Wei Biao Wu.  
Manuscript: <https://sayarkarmakar.github.io/publications/sayar5.pdf>
3. Asymptotic theory for dependent non-linear time-series with cyclic and trend components: Sayar Karmakar, Wei Biao Wu  
Manuscript: <https://sayarkarmakar.github.io/publications/sayar6.pdf>
4. Gaussian multiplier bootstrap for non-linear time series: Sayar Karmakar, Wei Biao Wu  
Manuscript: <https://sayarkarmakar.github.io/publications/sayar7.pdf>
5. Robust two-sample mean tests in presence of outliers: Sayar Karmakar, Ayanendranath Basu  
Manuscript: <https://sayarkarmakar.github.io/publications/sayarrobust.pdf>
6. Near unit-root models with time-varying coefficient: Sayar Karmakar, Mengyu Xu *in preparation*
7. Inference on models with non-Lipschitz and time-varying coefficients: Sayar Karmakar, Wei Biao Wu *in preparation*

## *Presentations and Talks*

Invited Talk: Gaussian approximation and its several applications *Indian Statistical Institute, Kolkata* (UPCOMING:- Feb 2018)

Invited Talk: Simultaneous confidence bands in time-varying coefficient models. *University of Illinois at Chicago* Oct 2017

Talk: Robust two-sample mean tests in presence of outliers. *Indian Statistical Institute* May, 2013

Poster: Clustering approach to identify clones in tumors *Young Statistician's conference* Melbourne, Feb 2013

Talk: High exome mutational burden in 58 African Americans with persistent extreme blood pressure *Institute of Genetic Medicine* Baltimore, June 2012

Poster: Statistical Methods to Identify clonal variations present in Tumour *Conference on Contemporary Issues and Applications of Statistics*, Kolkata, January 2012

Poster: Identification and differentiation between driver and passenger mutation applying clustering algorithm on next gen sequencing data. *61st ASHG meeting* Montreal, Canada, October 2011.

Talk: A brief review of geometric probability. *D. Basu Memorial Award*, Indian Statistical Institute, Kolkata, September 2011

## Research Interests

Time series analysis, Dependent data analysis, Gaussian multiplier bootstrap, Simultaneous inference of regression model, Functional data analysis, Change-point analysis, Analyzing periodical and cyclical variations, Embedding and strong invariance principle, Econometrics, High dimensional statistics, Sparse graphs, Tournament problems, Robust statistics, Genetics

## Teaching Experience

### *As Full-time Instructor*

Stat 234: Instructor in Autumn 2015

Chicago Academic Achievement Program: Instructor of Statistics in Summer 2016

Stat 234: Instructor in Summer 2017

### *As Teaching Assistant*

Graduate courses: STAT343, STAT345, STAT315

Undergraduate courses: STAT244, STAT245, STAT251

The responsibilities include holding regular Office hour, Doubt-clearing sessions, Problem sessions, Grading weekly homeworks, midterms and finals. Occassionally, I also suggested problems for Midterms, finals and thus help design the exams. Due to my experience in teaching, I had the chance to lecture multiple times in the absence of the corresponding Professors.

### *As Tutor*

College Core Tutoring Program at University of Chicago: Tutored for 8 quarters between 2014-2016.

Mathematics Olympiad tutor: 2008-2013. My students bagged one Gold, one Bronze and two Honorable mentions at International Mathematics Olympiad in different years.

## Statistics Consulting Experience

Effect of native /sign language on gesture pattern: Dinah Shender (Co-leader), Sayar Karmakar (Co-leader), Ye Tian, Fan Yang and Nuoya Zhou.

Grave Dating and Gender Roles: Mengyu Xu (Leader), Sayar Karmakar, Bo Luan

Effect of Rurality on Degree Attainment in College: Sayar Karmakar (Leader), Shan Lu

Chinese restaurant process to study inventor-patent relationships: Sayar Karmakar (Leader), Guanzhou Chen, Jinhan Ahn, Yangze Zhou.

## Refereed Journals

Annals of Statistics, Electronic Journal of Statistics, Statistics and Probability letters

## Awards

### *Statistics*

Runners up in the Statistics Consulting Program 2016-17 at University of Chicago.

Nominated for best tutor in Statistics in both 2014-15 and 2015-16 at the Core college tutoring program  
2nd prize for poster in Young Statistician's Conference, 2013, (Organized by SSAI )

USPROC 4th prize, 2011 ( Organized by Consortium for the Advancement of Undergraduate Statistics Education, <http://www.causeweb.org/usproc>)

IAS Summer Fellowship, 2011 to allow a review project on Geometric Probability under supervision of Prof. A. M. Mathai

### *Others*

Debesh Kamal Scholarship, 2013

Deans list, Indian Statistical Institute, 2008-2013

KVPY scholarship, 2009-2013

Rank 3, Regional Maths Olympiad, West Bengal, India 2012

Inspire Scholarship, 2010-2013

NCERT Scholarship, 2006-2008

Rank 1, National level Science Talent by "Jatiyo Biggyan Porishod" 2005

Top ranks in Statewise Mathematics talent by ADTM 2002-2007