



# ASA GEORGIA CHAPTER *Winter Lecture Series*

**4:00 PM, Thursday, December 8th, 2022**

Zoom link: <https://zoom.us/j/99347646840>

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## **Possible Hazards of Some Popular Hazard Rate Models**

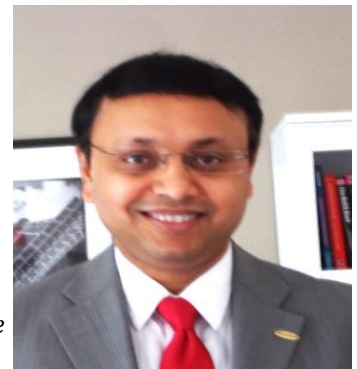
The Cox proportional hazard (PH) model is widely used to determine the effects of risk factors and treatments on survival time of subjects that might be right censored. The selection of covariates depends crucially on the specific form of the conditional hazard model, which is often assumed to be PH, accelerated failure time (AFT), or proportional odds (PO). However, it is shown that none of these semiparametric models allow for the crossing of the survival functions and hence such assumptions, although popular, may adversely affect the selection of risk factors. Moreover, the most commonly used PH assumption may also be violated when there is a delayed effect of the risk factors. A sequence of Bernstein polynomials based model is instead presented which provides (i) a smooth estimator of the conditional hazard and can be shown to be a unique solution of a strictly convex optimization problem; making it computationally attractive, (ii) a model that encompasses PH structure, and (iii) large sample properties including consistency and convergence rates can be established under a set of mild regularity conditions. Empirical results based on several simulated data scenarios indicate that the superior performances of the model, and thereby shown to avoid possible hazards of some of the commonly used hazard rate models.

*The presentation is based on some ongoing work and the following published articles: (i) [Osman and Ghosh \(2012\)](#) and (ii) [Sheng and Ghosh \(2019\)](#)*

### **About the Speaker**

Professor [Sujit K. Ghosh](#) is currently a tenured Professor and *Interim Department Head* in the Department of Statistics at North Carolina State University (NCSU) in Raleigh, NC, USA. He has over 25 years of experience in conducting, applying, evaluating, and documenting statistical analysis of biomedical and environmental data. Prof. Ghosh is actively involved in teaching, supervising, and mentoring graduate students. He has supervised over 40 doctoral graduate students and was awarded the *Cavell Brownie Mentoring Award* at NCSU Statistics in 2014. Prof. Ghosh has also served as a statistical investigator and consultant for over 45 different research projects funded by various leading industry and federal agencies. Prof. Ghosh has been regularly invited by several institutions and conference organizers around the world to present talks. He has given over 180 invited lectures, seminars at national and international meetings. Prof. Ghosh has published over 125 peer-reviewed journal articles in the various areas of statistics with applications in biomedical and environmental sciences, econometrics, and engineering. He has co-authored a book titled *Bayesian Statistical Methods* published in 2019, which has been adapted as textbook by many leading institutions.

Prof. Ghosh received the International Indian Statistical Association (IISA) *Young Investigator Award* in 2008; was elected a Fellow of the American Statistical Association (ASA) in 2009; was elected as the *President of the NC Chapter of ASA* in 2013 and elected as the *President of the IISA* in 2017. He was the recipient of the prestigious *Honorary Doctorate in Statistics* at Thammasat University (Thailand) in 2015. Furthermore, he has also served as the *Program Director in the Division of Mathematical Sciences (DMS)* within the Directorate of Mathematical and Physical Sciences at NSF in 2013-2014 and during 2014-2017 he served as the *Deputy Director* of the Statistical and Applied Mathematical Sciences Institute (SAMSI), RTP, NC, an institute funded by the NSF.



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