

PROFESSOR CHRIS P. TSOKOS: A BRIEF REVIEW OF STATISTICAL, MATHEMATICAL AND PROFESSIONAL CONTRIBUTIONS AND LEGACIES

G. S. Ladde and M. Sambandham

Department of Mathematics and Statistics
University of South Florida, 4202 East Fowler Avenue, PHY 114
Tampa, Florida 33620-5788 USA

and

Department of Mathematics, Morehouse College
Atlanta, Georgia 30314, USA

ABSTRACT

Professor Chris P. Tsokos' contributions to statistics, mathematical sciences, engineering and international education over a period of almost a half century are well-known, well-recognized and well-documented in the literature. In particular, his most notable work in the Bayesian reliability, stochastic dynamic systems and statistical modeling in a nonlinear and nonstationary world is well-recognized and well-established. He is one of the few Distinguished University Professors at the University of South Florida. Professor Tsokos is a highly dedicated and highly effective teacher. He is preacher and Socratic type of interactive teaching and learning process. Professor Tsokos is truly outstanding educational leader with highly exceptional organizational and communicational skills. In fact, he is king maker. Professor Tsokos has rendered service to international education, cultural, governmental and professional organizations. In fact, he is the founder of the American Foundation for Greek Language and Culture, a non-profit public educational organization. He has established the USF Urban Scholars Outreach Program in 1998 to academically assist African American and Hispanic students. Furthermore, Professor Tsokos is a very frank and straightforward colleague, educator, friend and teacher in the sense of word and deed. He has initiated and nurtured academic programs in statistical sciences with a sound and active intellectual learning environment, a dignity and personal sacrifices. He is warrior who has fought cancer twice courageously during the past 5 years. These are a few of his legacies.

1. INTRODUCTION

The part of this effort is based on a special and a featured introduction of Professor Tsokos given in the Fifth International Conference on the "Dynamic Systems

and Applications" that was held at Morehouse College, Atlanta, Georgia, USA, during May 30-June 2, 2007. This special issue of the Journal of Neural Parallel and Scientific Computations is featured to dedicate and to honor Professor Tsokos' steadfast almost a half century scientific contributions to the statistical and mathematical sciences. Professor Tsokos' colleagues and students express their genuine gratitude to his colleague/teacher for his constant encouragement, persistence and unconditional support to shape their academic life and career by making their contributions to this special issue. Moreover, this issue also recognizes Professor Tsokos' tenacity and courage and dedication to his professional commitments even during his serious fight with cancer. It is our great pleasure and privilege to honor and to recognize Professor Chris P. Tsokos' personal commitments and service to the statistical and mathematical sciences, his students, the United States Government and his profession even under personal life-threatening conditions. His community, educational, professional and scientific contributions together with his strong personal character are legacies.

The organization of the paper is as follows: Section 2 deals with Professor Tsokos' notable contributions in the statistical and mathematical sciences, in particular, in the statistical analysis of nonlinear dynamic processes in a nonlinear and nonstationary world. A very few selected concepts, problems, and topics that led to and opened the new directions/avenues in the stochastic modeling and statistical analysis of nonlinear processes in sciences, are outlined. Professor Tsokos' outstanding and highly dedicated contributions in the teaching profession and as a teacher are briefly described in Section 3. His contributions in the higher education institutions as an initiator/organizer are presented in Section 4. Section 5 deals with Professor Tsokos' community, international education and professional contributions. The byproducts of his life-long love and commitments are his gifts and his unconditional services to the members of the mathematical and applied sciences community around the world. Professor Tsokos' legacies as an architect, an educator, a friend, a scholar, and a teacher are presented in Section 6. A few references are also provided.

2. CONTRIBUTIONS IN STATISTICAL AND MATHEMATICAL SCIENCES

Professor Tsokos has devoted his almost half-century professional life to explore the nonlinear world with nonlinear and nonstationary statistical analysis. He is more

dynamic than Mother Nature. In fact, Mother Nature is orbitally stable; however, it is reasonably accurate to say that Professor Tsokos is not. He has a fertile imagination, full of ideas, enormous energy and enthusiasm without any stationary and singularity points/orbits.

Professor Tsokos' highly dedicated advisory service and his contributions to our Federal Government agencies such as EPA, AIR FORCE, ARMY, NAVY, NSF, etc. are highly recognized. In addition, his dedication to the cause of the American Cancer Society is well-recognized.

As of date, Professor Tsokos has published over 300 research papers and 40 technical reports. Out of 300 papers more than 250 papers are published in the refereed scientific journals through out the world and about 50 papers appeared in the refereed proceedings of National and International conferences/congress/ symposiums/workshops/ etc. His research work is sponsored by the National Science Foundation, NASA, Institute of Health, the Office of Naval Research, the U. S. Air Force, and U. S. Army. As of date his projects have earned close to two million dollars research grant. He has authored/co-authored about 20 monographs and books. He has also organized several international professional conferences and five world congresses, and edited/co-edited several journals and monograph series. Professor Tsokos' breadth and depth of knowledge and interests are reflected in his research publications. Most of the work is jointly published with his more than 40 Ph. D. students, several colleagues and academic friends around the globe. He truly shares his knowledge with others in word and deed. His diverse interests without boundaries together with his ability to inspire anybody and everybody exhibit his "TRUE" personal character. In fact, his frankness and outspoken nature shows his caring and nurturing character. This is because of the fact that he cares too much, and hence he tries to protect almost anyone who is associated with him.

In the following, by keeping in mind the interests of the readers of this journal, we make an attempt to present a basic and reasonably simple concepts, problems, and topics that are representative of his major areas, namely, stochastic modeling, statistical, probabilistic and mathematical analysis.

P -Probabilistic Models
R -Regression Models
O -Order Statistical Models
F -Forecasting Models
E -Ecological Models
S -Stochastic Models
S -Statistical Models
O-Optimal Control Models
R-Robustness in Models

C -Control Theory
H -Hypothesis Testing Theory
R -Reliability Theory
I -Information Theory
S -Sampling Theory

P -Population Dynamics

T-Time Series Analysis
S-Sensitivity Analysis
O -Order Statistical Analysis
K-Kernel Estimate Analysis
O -Optimal Bandwidth Analysis
S - Stability Analysis

Now, in the following, we provide the list of monographs/books published by Professor Tsokos with his students and associates.

RESEARCH MONOGRAPH, TEXTBOOKS AND BOOK CHAPTERS:

- CPT1. Chris P. Tsokos and W. J. Padgett, "Random Integral Equations and Applications To Stochastic Systems, Lecture Notes in Mathematics, Springer-Verlag, New York, 1971.
- CPT2. Chris P. Tsokos, "Probability Distributions: An Introduction to Probability Theory with Applications", Wordsworth Publishing Company, Belmont, California, 1972.
- CPT3. Chris P. Tsokos and W. G. Nichols, On Some Stochastic Differential Games, A Chapter in "Probabilistic Methods in Applied Mathematics Vol III "(Edited by T. Bharucha-Reid), Academic Press New York, 1973.
- CPT4. Chris P, Tsokos, Forecasting Models from Non-stationary Time Series-Short Term Probabilistic Stocks, a Chapter in "Mathematical Methods in Investment and Finance", North Holland Publishing Company, 1973

- CPT5. Chris P. Tsokos and W. J. Padgett, "Random Integral Equations with Applications to Life Sciences and Engineering, Mathematics in Sciences and Engineering", Academic Press, New York, 1974.
- CPT6. Bivariate: The Probability distribution of the Logarithm of the Sum of two Log-Normally Distributed Random Variables, "Encyclopedia of Computer Sciences and Technology", Vol. III, 1976.
- CPT7. Chris P. Tsokos and I. Shimi (Editors), "Theory and Applications of Reliability with Emphasis on Bayesian and Nonparametric Methods", Vol. I, Academic Press, New York, 1976.
- CPT8. Chris P. Tsokos and I. Shimi (Editors), "Theory and Applications of Reliability with Emphasis on Bayesian and Nonparametric Methods", Vol. II, Academic Press, New York, 1976.
- CPT9. Chris P. Tsokos and J. S. Milton, "Probability with Essential Analysis", Advanced Book Program, Addison-Wesley, Reading, Massachusetts, 1976.
- CPT10. Chris P. Tsokos, "Mainstreams of Finite Mathematics with Applications", Charles E. Merrill Publishing Company, 1978.
- CPT11. Chris P. Tsokos, J. C. Turner and R. M. Thrall (Editors), "Proceedings of the Workshop on Decision Information for Tactical Command and Control", Air Force House, Virginia.
- CPT12. Chris P. Tsokos and R. M. Thrall (Editors), "Information Sciences", Academic Press, New York, 1979.
- CPT13. Chris P. Tsokos, "Handbook of the Logistic Distribution", Application to Health and Social Sciences, Chapter, Marcel-Deller, Inc., New York, 1991.
- CPT14. Chris P. Tsokos, "Recent Advances in Life Sciences", Reliability Growth: Nonhomogeneous Poisson Process, Chapter, CRC Press, Inc., 1995.
- CPT15. Chris P. Tsokos, "Applied Probability", Mancorp Publishers, Inc., 1997.
- CPT16. Chris P. Tsokos and V. Vavchok "Bayesian Statistical Methods with Applications", World Federation Publishers, Atlanta, Georgia, 1998.
- CPT17. Chris P. Tsokos, "Introduction to Mathematical Statistics and Applications", Prentice-Hall Publications Company, Englewood Cliffs, N. J., 2003.

Professor Tsokos is the Co-Editor of several journals and series of book and monographs:

1) " , and 2) ". He is a Member of Editorial Board of several international journals,

3. CONTRIBUTIONS IN TEACHING PROFESSION

Professor Tsokos has fostered, initiated, nurtured, promoted, and strengthened the teaching profession in the "true sense" of spirit, letter and word. This statement is based on the first author's personal experience as a student. He is "compassionate conservative in the 'true sense'". He exhibits his conservatism by demanding quality and independence from his students, and shows his compassionate character by being personable and social with them. He is gifted by his ability to recognize the "human potential". Whenever it is possible for him, he encourages an individual to utilize one's academic strengths. He has a natural ability to reach out to students to ignite the latent abilities and to bring to the surface. He makes very serious efforts to challenge his student to understand the nature of the subject. At times, it seems to be very rough and tough, but underneath that roughness and toughness his heart is very soft like jelly.

Professor Tsokos is "unique" with his "universal appeal". He is blessed by his ability to reach and to instill a universal appeal in others. His students, friends and associates are also blessed by his ability to persist for the "universal cause" and also "common good".

Professor Tsokos' tolerance to the "compassionate conservative profession-Teaching" is well-established and well-known over a period of about half century of his life. His appreciation and approach to the "sensitivity" towards human interactions is also well-known. In fact, the University of South Florida has recognized his outstanding teaching by honoring him with "The USF Outstanding Undergraduate Teaching Award" and "The USF Teaching Program Award". .. In fact, we would like to quote from one of his very successful students" he is a special teacher,the bulb he planted in me during classes still blooms, like a tulip each spring."

4. CONTRIBUTIONS IN HIGHER EDUCATIONAL INSTITUTIONS

Professor Tsokos is very creative, and he has a dynamic personality. He is an academic administrator who is distinguished by fulfilling plenty of academic goals with an action

packed approach. These statements can be justified by his distinguished accomplishments over a period of more than 45 years at 3 higher educational institutions, namely:

- (1) University of Rhode Island, Kingston, Rhode Island, USA, 1961-1969,
- (2) Virginia Polytechnic Institute and State University, Blacksburg, Virginia, USA 1969-1972,
- (3) University of South Florida, Tampa, Florida, USA, 1972-Present.

In fact, wherever he went, he initiated basic academic developments to promote knowledge and to bring it to the classroom by introducing several undergraduate and graduate courses, programs and centers with innovative ideas. Moreover, he brought these institutions on the map of the academic communities in the world.

Professor Tsokos has plenty of faith in him self, his students and his colleagues. He is always open to new ideas and approaches for the betterment and the benefit of the institution and common good. Of course, whenever he is convinced about the academic issues, he goes after its solution, vigorously with his full capacity.

Professor Tsokos is courageous to defend the actions when the action is "right", are noticeable. His willingness to scarify when the "cause" is "right", is also well-known. He is the true friend of under-dogs. These are his strengths of his character. His ability to work under extreme conditions is extraordinary. In short, he gives everything he has for the betterment of academic values of the higher education institution.

5. COMMUNITY, EDUCATION AND PROFESSIONAL SERVICES

Professor Tsokos has also offered professional and educational assistance to government agencies, schools organizations, and philanthropic foundations, civic centers, etc. around the world. One example is his unconditional service to the USF Urban Scholar Outreach Program. He has co-founded and continuously shepherds the Urban Scholars Program which helps and provides academic coaching to underprivileged students and minorities. His dedicated educational service was recognized by his being presented "The Time Warner/Debaritolo Foundation, the Spirit of Humanity Award".

Professor Tsokos established at USF the prestigious educational "American Foundation for Greek Language and Culture" (AFGLC) www.afglc.org, a non-profit public educational organization. For the past fifteen years he has served as the president of this outstanding organization. The primary goal of this organization is to promote and

preserve the all-important legacy of Hellenic language, culture and values. The largest Greek-American newspaper, "Hellenic Voice", Boston, MA, has recognized Professor Tsokos's accomplishments by awarding him the "Hellenic of the Year Award: Humanities and Education". In addition, he has also received "The University of Rhode Island Alumni Excellence Award in Science and Technology" and a scholarship has been established in his name.

In short the byproducts of his life-long love and commitments are his gifts and his unconditional services to the members of the mathematical and applied sciences community around the world. More importantly his eagerness to help others will be an important part of his legacies.

6. LEGACY

Professor Tsokos' legacies as an educator, a teacher, and an administrator are as follows:

1. Professor Tsokos' natural abilities to reach out to his students and friends to energize, to ignite the latent mathematical ability and to bring to the realization are rare.
2. His abilities to recognize the "Human Potential and Abilities" and to bring to the surface in a sensitive and compassionate-conservative manner for the universal cause and common good are rare and remarkable.
3. His academic administrative contributions to the 3 higher educational institutions are well-recognized and well-documented.
4. He is truly a warrior. He has survived cancer attacks during the past 5 years. In fact, during the period of fight he has never shown a sign of weakness, but has always been upbeat, full of energy.

In summary: Professor Tsokos' commitments and life-long love for mathematical sciences, education and students, his unconditional service to the institutions, communities and profession as well as governmental organizations, and his courage and tenacity to fight with adverse and deadly natural forces with a grace and dignity without affecting daily personal responsibilities to his profession and family are his valuable gifts to the members of the educational, academic, mathematical sciences communities around the world.

7. REFERENCES

- GSL1. Ladde, G. S. "Knowing as a Teacher, Friend, Colleague, Professional and Scholar over the Period of 40 years"
- SAM2. M Sambandham., ""Knowing as a Friend, Colleague, Professional and Scholar over the Period of 25 years.
- CPT3. The Professor Chris P. Tsokos' Curriculum Vitae".