

Past Speakers

2019 Dr. Michael C. Kavanaugh
Senior Principal, Geosyntntec Consultants, Inc.
Member, National Academy of Engineering
Fellow, Water Environment Federation

2018 Dr. Robert A. Dalrymple
Professor - Johns Hopkins University

2017 Dr. David R. Maidment
Hussein M. Alharthy Centennial Chair
University of Texas at Austin

2016 Dr. Rafael L. Bras
Provost & Executive Vice President for
Academic Affairs, Professor
Georgia Institute of Technology

2015 Dr. Vijay P. Singh
Professor - Texas A&M University

2014 Dr. Larry W. Mays
Renown Author
Professor - Arizona State University

2013 Dr. Lindell Ormsbee
Director of the Kentucky Water Resources
Research Institute
Professor - University of Kentucky

2012 Dr. Kalanith Vairavamoorthy
Executive Director of Patel School of Global
Sustainability Professor-University of S
Florida

The G.V. Loganathan Distinguished Lecture



Presented by

**Rao S. Govindaraju, PhD., P.E.,
P.H., D.WRE, F.EWRI,
Dist.M.ASCE**

**Some Perspectives on Uncertainty
Assessment in Hydrologic Models**

Friday, October 29, 2021 at 2:45 pm
in 1670 Litton-Reaves Hall

Reception to follow in the Lobby

The **G.V. Loganathan Distinguished Lecture Series** was established to honor the contributions of scholarship, instruction and service by Dr. G.V. Loganathan in the area of water resources engineering and in memory of Dr. Loganathan and his students of the Advanced Hydrology class, 2007.

G.V. Loganathan was an internationally renowned researcher in the field of engineering hydrology and water resources systems. G.V. joined the Virginia Tech faculty in 1982 after completing his Ph.D. degree from the School of Civil Engineering at Purdue University. G.V. wrote more than 150 peer-reviewed academic publications on a variety of topics including urban stormwater hydrology, drought modeling and low-flow analysis, optimization and decision analysis and drinking-water infrastructure. He received the ASCE Wesley W. Horner Best Paper Award in 1996. He was named the Outstanding Civil Engineer of the Year by the Virginia Section of the American Society of Civil Engineers in 2007.

G.V. was the five-time recipient of the CEE Faculty Achievement Award; an annual award determined by the CEE student body. He was dedicated to his students; both undergraduate and graduate students. G.V. directed 42 graduate students including 8 Ph.D. dissertations.

The G.V. Loganathan Memorial Fellowship was established in loving memory and in his honor for graduate students working in G.V.'s area of research. Other scholarships in honor of students of the 2007 Advanced Hydrology class are the Brian Roy Bluhm Memorial Graduate Fellowship for VT BSCE graduates in water resources engineering, the Matthew Gwaltney Memorial Graduate Fellowship for graduate studies in water resources engineering.

Abstract

All hydrologic models incur uncertainties to varying degrees. Measurement uncertainty exists due to error in measurements of properties and variables. Structural uncertainty arises from errors in mathematical representation of real-world hydrological processes. Parametric uncertainty results from structural and measurement uncertainty, and availability of limited amount of data for calibration. Isolating the role of individual uncertainties is needed for facilitating rejection of deficient models, and to determine whether the model structure or the measurements need to be improved to reduce the total uncertainty. Information about uncertainty in a modeling exercise is deduced from the residual time-series (difference between observed and simulated model outputs) that represents the aggregated effect of all uncertainties. Despite the strong influence of uncertainty on decision making, adaptation of uncertainty analysis has not been popular. Even if information on input uncertainties is available or deduced, efficient algorithms are not available to incorporate them into the modeling process, and consequently this uncertainty information is left behind. While several studies have addressed the problem of measurement and parametric uncertainties, structural uncertainty has not received adequate attention. In this talk, some methods for incorporating uncertainty in hydrologic modeling exercises will be presented. Examples of assessing structural uncertainty in the context of watershed hydrology will be discussed using the backdrop of prediction at ungauged locations. Some methods for isolating individual uncertainties will be discussed along with challenges in implementation. Directions for future work in this area will be explored.

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Biography

Rao S. Govindaraju is the Bowen Engineering Head and the Christopher B. and Susan S. Burke Professor in the School of Civil Engineering at Purdue University. He earned his PhD in civil engineering from the University of California, Davis, in 1989. His primary areas of research include surface and subsurface hydrology, contaminant transport, watershed hydrology, and climatic influences. He is interested in developing algorithms for analyzing and learning from hydrologic data. He specializes in problems dealing with uncertainty and spatial variability. His research work has been supported by various agencies such as NSF, EPA, DOD, and DOE. He has chaired national level committees, and has served on the editorial boards of several journals. He is currently the Editor-in-Chief of Journal of Hydrologic Engineering, American Society of Civil Engineers, and served as the President of American Institute of Hydrology (2017-2018). His work has been recognized with numerous national and international awards.