

**LARRY W. MAYS, Ph.D., P.E, P.H., F.ASCE, D.WRE**

**Professor, Civil, Environmental, and Sustainable Engineering Group  
School of Sustainable Engineering and the Built Environment  
Arizona State University  
Tempe, Arizona 85287-5306**



Professor Mays' academic career has spanned over a 42 year time period, starting at the University of Texas in Austin in 1976, followed by the last 29 years at Arizona State University where he has been a Professor of Civil and Environmental Engineering since August 1989, and is now in the School of Sustainable Engineering and the Built Environment. He served as Chair of the Civil and Environmental Engineering Department from August 1989 until July 1996. Prior to that, he was Director of the Center for Research in Water Resources at The University of Texas at Austin.

Professor Mays received the B.S. (1970) and M.S. (1971) degrees in civil engineering from the University of Missouri at Rolla, after which he served in the U.S. Army, (1970-1973) stationed at the Lawrence Livermore Laboratory in California. He received the Ph.D. in civil engineering from the University of Illinois at Urbana-Champaign in 1976.

His research in the area of hydrosystems engineering has focused on the application of optimization and risk/reliability analysis to the design, management and operation of water infrastructure systems. The mentoring of graduate students has also been a major focus in his career having supervised to completion 34 Ph.D. students and many master's degree students. His research has been published in over 120 refereed journal publications, another 112 proceeding papers for national and international meetings, 13 invited book chapters, and over 70 chapters in the books that he was the editor-in-chief.

Professor Mays is the author, co-author, or editor-in-chief of 24 books including the well-known textbooks **Water Resources Engineering**; **Groundwater Hydrology**; **Applied Hydrology**; **Hydrosystems Engineering and Management**; **Ground and Surface Water Hydrology**; and handbooks such as the **Water Resources Handbook**; **Water Distribution Systems Handbook**; **Hydraulic Design Handbook**; **Stormwater Collections Systems Design Handbook**; and others.

His interests for over the last 20 years have expanded to the visiting many archaeological sites around the world photographing and studying ancient water structures. He has published several articles on this topic and has edited the book, **Ancient Water**

**Technologies.** More recently he has been a co-editor of the new book, **The Evolution of Water Supply Through the Millennia**, published by the International Water Association.

Professor Mays has done volunteer work for organizations such as the United Nations UNESCO-IHP in developing the book, **Integrated Urban Water Management in Arid and Semi-Arid Regions**. Other professional activities have included serving as a consultant to various government agencies and industries and serving as an expert witness in several litigations concerning flooding and other water-related issues.

He is a registered professional engineer in several states in the US, a registered professional hydrologist with the American Institute of Hydrology, and a member of several professional associations. Throughout his career he has also obtained considerable expertise in litigation as an expert and consulting witness on several types of large-scale litigation related to water. He has also consulted on an international basis for such organizations as the UNDP, the World Bank, UAE University, and many others, and as a consultant to many government agencies and municipalities such as the State of Texas Attorney General's Office, Metropolitan Water District of Southern California, American Water Works Association, U.S. Army Corps of Engineers, etc., and many insurance companies and law firms.

Professor Mays is a **Fellow** of the American Society of Civil Engineers (ASCE), the International Water Resources Association (IWRA), and the International Water Association (IWA).

He has been a representative to the Universities Council on Water Resources (UCOWR) and has served on the Board of Directors of UCOWR and also as President. He received the **Engineer of the Year in Education Award** from the Arizona Society of Professional Engineers in 1992 and the **Quentin Mees Research Award** from the Arizona Water and Pollution Control Association in 1993. He has been elected a **Diplomat of the American Academy of Water Resources Engineers**.

In 1999 he received the **Distinguished Alumnus Award** from the Department of Civil Engineering Alumni Association at the University of Illinois at Urbana-Champaign. He is **Lifetime Member** of ASCE.

In June 2014 he received the **ASCE Julian Hinds Award** and in December 2014 he received the **Prince Sultan Bin Abdulazizz International Prize for Water – Surface Water Prize**.

In June 2015 he received the **Warren A. Hall Medal** presented by the Universities Council on Water Resources (UCOWR) and was also elected **Fellow** of the International Water Association in 2015.

In April 2016 he was inducted into the **Academy of Civil Engineers** of the Missouri University of Science and Technology (MUST).

In May 2016 he received the **ASCE Ven Te Chow Award**.

One of my more recent service accomplishments has been the development of a website on ancient water technologies, <http://ancientwatertechnologies.wordpress.com>. I began development of this website five years ago over which time has been viewed by many students ranging from grade school, high school and college students and many others interested in this subject. **During 2017 this site had 7,000 visits and 12,000 views by people from 117 countries.** Photographs are all mine and were taken in many countries around the world. I developed this site as a result of my interest in ancient water technologies and the possible use of these technologies to help solve water problems in developing parts of the world that do not necessarily need the advanced technologies.



**Prince Sultan Bin Abdulaziz International Prize for Water** being presented by HRH King Salman bin Abdulaziz of Saudi Arabia.

Link to short film:

[http://psipw.org/index.php?option=com\\_content&view=article&id=369&Itemid=289](http://psipw.org/index.php?option=com_content&view=article&id=369&Itemid=289)

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## **LARRY W. MAYS, Ph.D., P.E, P.H., F.ASCE, D.WRE**

Professor, Civil, Environmental, and Sustainable Engineering Group  
School of Sustainable Engineering and the Built Environment  
Honors Faculty, Barrett Honors College  
Arizona State University  
Tempe, Arizona 85287-5306

### **EDUCATION**

B.S.--Civil Engineering, University of Missouri at Rolla, 1970  
M.S.--Civil Engineering, University of Missouri at Rolla, 1971  
Ph.D.--Civil Engineering, University of Illinois, 1976  
Dissertation: Optimal Layout and Design of Storm Sewer Systems

### **REGISTRATIONS**

#### Registered Professional Engineer

California (No. 23103)  
Arizona (No.24414)  
Texas (130415)

Inactive Registrations: Arkansas (No. 5736), Illinois (N. 62-33714), Louisiana (No. 20838), Missouri (No. 21028), Oklahoma (No. 13601), previous registration in Texas (No. 42533).

#### Registered Professional Hydrologist

American Institute of Hydrology (No. 757)

### **MAJOR AREAS OF RESEARCH INTEREST**

Water Resources Sustainability  
Sustainable Urban Water Systems  
Integrated Urban Water Management (Arid and semi-arid climates)  
Study of Ancient Water Systems and the Relation to Modern-Day Sustainability  
Water Resource Systems Analysis (application of operations research and probability and statistical analysis)  
Applied Hydrology and Hydraulics  
Unsteady Flow Modeling, Real-time Management of Reservoirs during Flooding  
Floodplain and Stormwater Management  
Reliability Based Design and Analysis of Water Infrastructure Systems  
History of water engineering and management

## **PROFESSIONAL EXPERIENCE**

Professor, School of Sustainable Engineering and the Built Environment, Arizona State University, 2010–present.

Professor of Civil and Environmental Engineering, Arizona State University, August 1989-2010.

Chair of Department of Civil and Environmental Engineering, Arizona State University, August 1989-July 1996.

Director, Center for Research in Water Resources, The University of Texas at Austin, January 1988-August 1989.

Area Coordinator, Environmental and Water Resources Engineering.

Engineering Foundation Endowed Professor, Department of Civil Engineering, The University of Texas at Austin, September 1987-August 1989.

Professor, Department of Civil Engineering, The University of Texas at Austin, September 1986-August 1989.

Associate Professor, Department of Civil Engineering, The University of Texas at Austin, September 1981-August 1986. (Roberta Woods Ray Centennial Fellow in Engineering)

Assistant Professor, Department of Civil Engineering, The University of Texas at Austin, September 1976-August 1981.

Visiting Research Assistant Professor, Department of Civil Engineering, University of Illinois, January 1976-August 1976.

Graduate Research Assistant, Department of Civil Engineering, University of Illinois, June 1973-January 1976.

Civil Engineer, U.S. Army Engineer (WES) Explosive Excavation Research Lab., Lawrence Livermore Lab., Livermore, California, November 1971-June 1973.

Hydraulics Engineer, Water Resources Division, U.S. Geological Survey, Creve Coeur, Missouri, June 1970-August 1970.

**BOOKS PUBLISHED (24 books as author, co-author, or editor-in-chief)**

**Applied Hydrology**, by V. T. Chow, D. R. Maidment, and L. W. Mays, McGraw-Hill, 1988. 570 pages. (Translated into Spanish in 1994 as *Hidrología aplicada*, and distributed by McGraw Hill Interamericana)

**Reliability Analysis of Water Distribution Systems**, L. W. Mays, Editor, ASCE, 1989.

**Hydrosystems Engineering and Management**, by LW. Mays and Y.K. Tung, McGraw-Hill, 1992. (presently available from Water Resources Publications, Littleton, Colorado)

**Computer Modeling of Free-Surface and Pressurized Flow**, Co-editor with M. Hanif Chaudhry, Kluwer Academic Pubs., 1994.

**Water Resources Handbook**, Larry W. Mays, Editor-in-Chief, McGraw-Hill, 1996.

**Optimal Control of Hydrosystems**, by L. W. Mays, Marcel-Dekker, Inc., 1997.

**Hydraulic Design Handbook**, Larry W. Mays, Editor-in-Chief, McGraw-Hill Book Co., 2000. (translated into Korean)

**Water Distribution Systems Handbook**, Larry W. Mays, Editor-in-Chief, McGraw-Hill Book Co., 2000. (translated into Spanish in 2002 and into Korean in 2010).

**Water Resources Engineering**, 1<sup>st</sup> Edition, by Larry W. Mays, John Wiley and Sons, Inc., 2000, 2005 Edition, 2<sup>nd</sup> Edition 2011, and 3<sup>rd</sup> Edition 2019.

**Stormwater Collection Systems Design Handbook**, L. W. Mays, Editor-in-Chief, McGraw-Hill, 2001.

**Urban Water Supply Handbook**, Larry W. Mays, Editor-in-Chief, McGraw-Hill Book Co., 2002.

**Urban Stormwater Management Tools**, Larry W. Mays, Editor-in-Chief, McGraw-Hill, 2004.

**Urban Water Supply Management Tools**, Larry W. Mays, Editor-in-Chief, McGraw-Hill, 2004.

**Water Supply Systems Security**, Larry W. Mays, Editor-in-Chief, McGraw-Hill, 2004..

**Groundwater Hydrology**, 3<sup>rd</sup> edition, with David Keith Todd, John Wiley & Sons, Inc., 2005.

**Water Resources Systems Management Tools**, L. W. Mays, Editor-in-Chief, McGraw-Hill, 2005.

**Water Resources Sustainability**, L. W. Mays, Editor-in-Chief, McGraw-Hill, 2007.

**Integrated Urban Water Management in Arid and Semi-Arid Regions**, L.W. Mays, Editor-in-Chief and author of six chapters, for UNESCO-IHP, published by Taylor and Francis, London, 2009.

**Ancient Water Technologies**, L.W. Mays, Editor-in-Chief, Springer, The Netherlands, 2010. (Author of five of the chapters).

**Water Transmission and Distribution**, L.W. Mays editor of the 4<sup>th</sup> edition, American Water Works, Association, Denver, 2010.

**Ground and Surface Water Hydrology**, by Larry W. Mays, John Wiley and Sons, Inc., 2012.

**The Evolution of Water Supply Through the Millennia**, Editors: A. N Angelakis, L. W Mays, D. Koutsoyiannis, and N. Mamassis, International Water Association (IWA) Publishing, pp. 550, ISBN: 9781843395409, Copyright May 2012.

Book endorsement by **300in6** (strategic centre for safe water scale-up, and a rich hub of knowledge, solutions and opportunities) **The Evolution of Water Supply Through the Millennia**

## THE WATER BOOK OF THE YEAR, DECADE, MILLENIA!

JANUARY 2, 2014

It comes in weighty with some 600 pages, but that's not why '*Evolution of Water Supply Through the Millennia*' shakes in your hands. The book vibrates with that impassioned knowledge that engineers sometimes allow themselves. Clearly a labour of love, it is fabulous, in the true sense of the word, relying on ancient fables, legends, parchment scripts and original stone tablets for some of its tales.

It sweeps us from the early treatment and delivery of water in such societies as ancient Egypt, Greece, Mexico and Peru, up to today. The vision and precision of our forebears puts into perspective, in the unfailing spotlight of history, today's breath-taking dilemma of all the tech in the world and three to four billion people with unsafe water. When did we lose the plot?

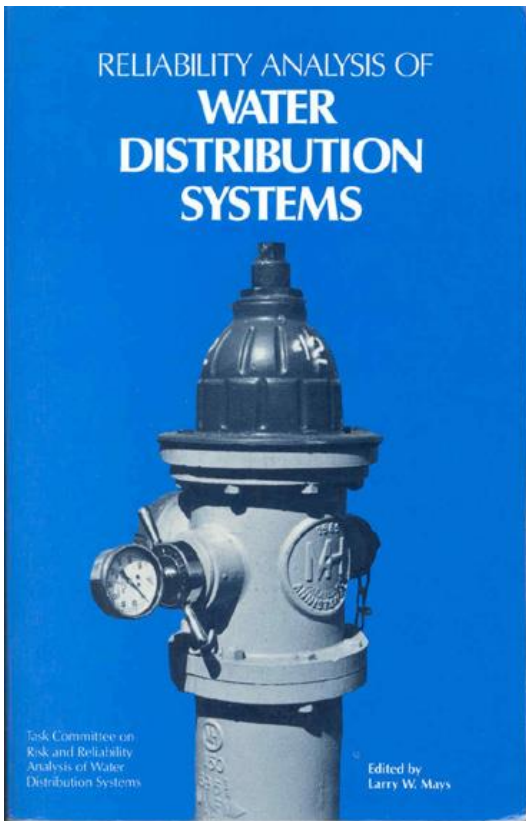
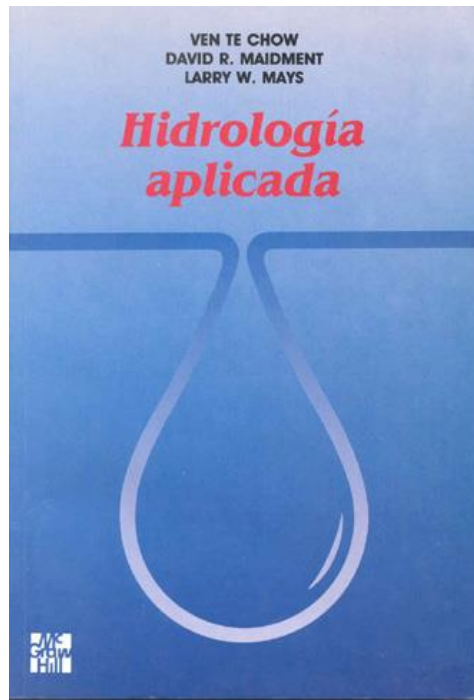
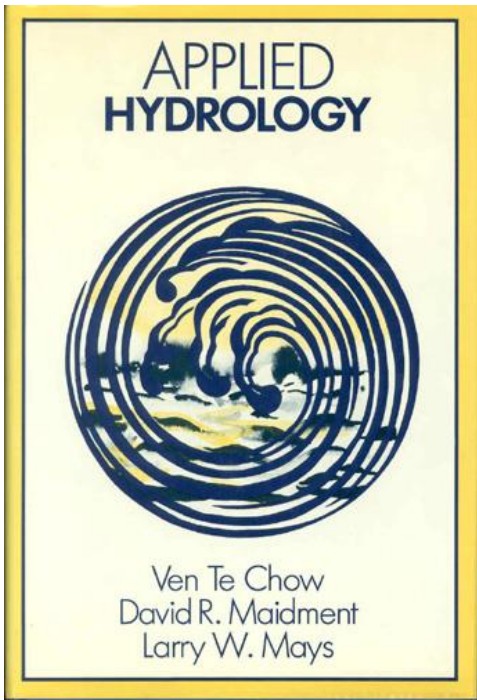


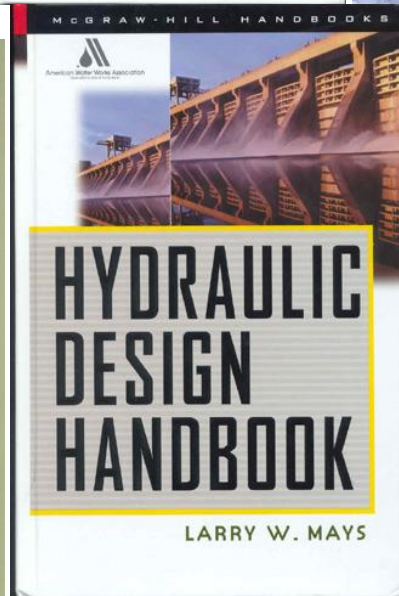
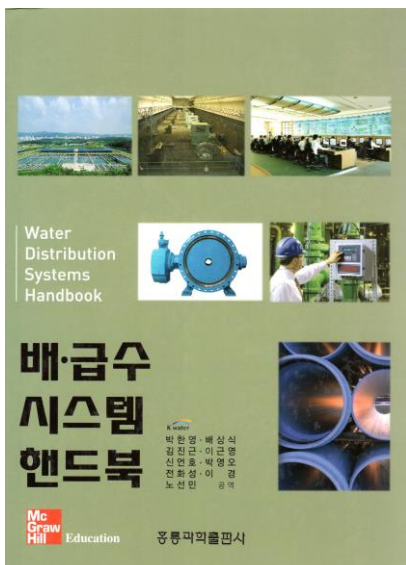
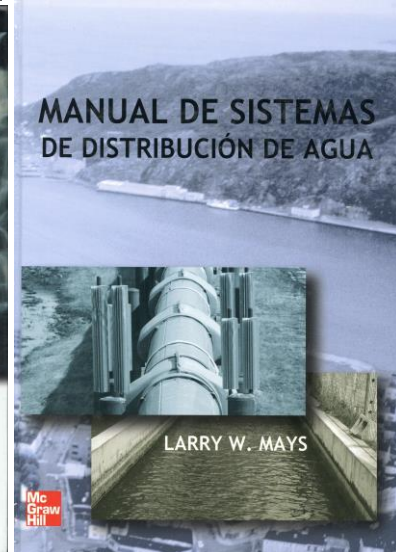
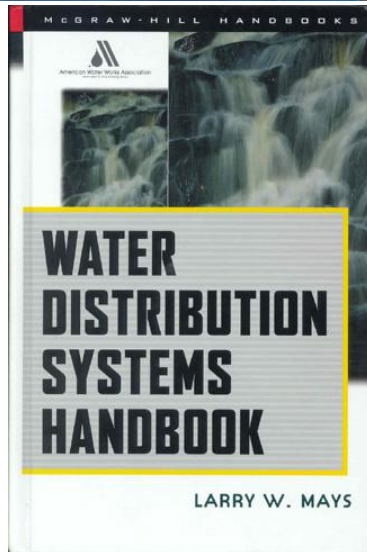
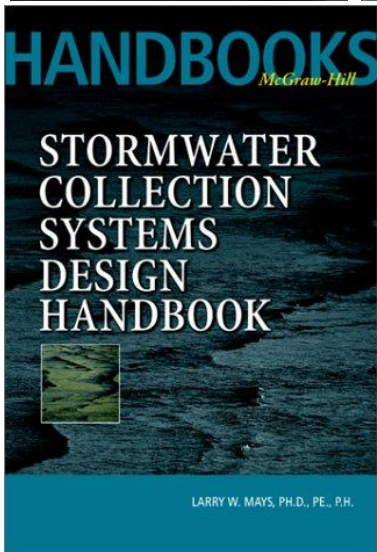
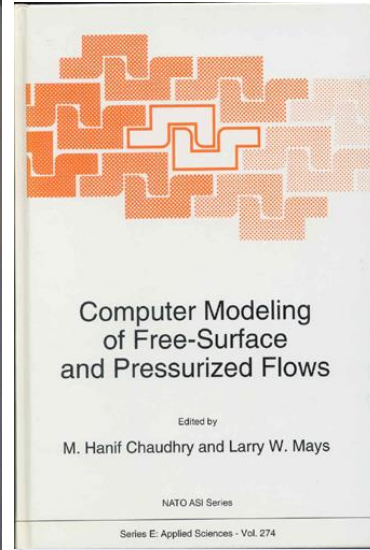
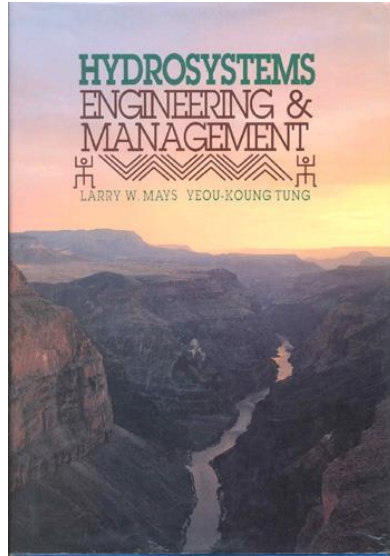
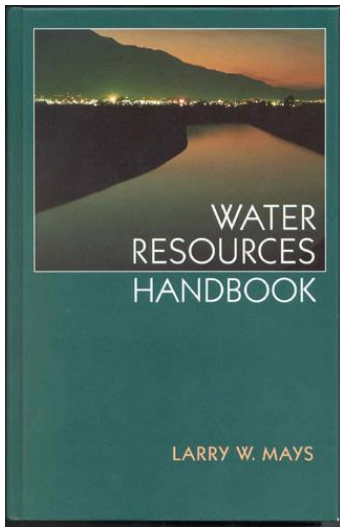
We found this book and its committed authors, a full 500 days too many after publication, when scoping our video on the history of safe water. It is both gorgeous and instructive, and the more the pity that the authors and publishers see it as just a course book for post-graduates. Well, ok – for historically-informed engineers are the best – but it deserves a wider circle of admirers than that.

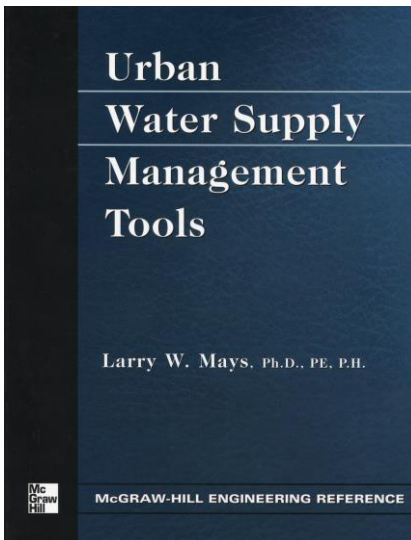
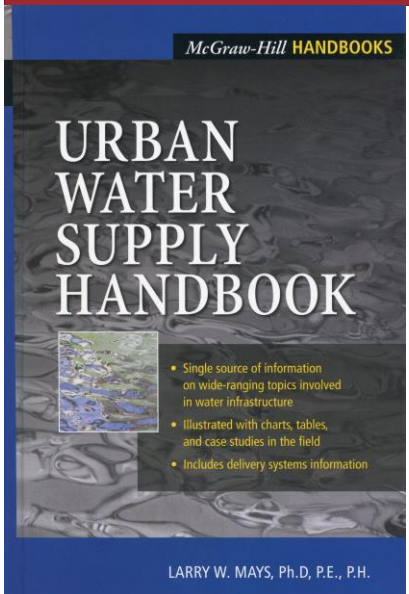
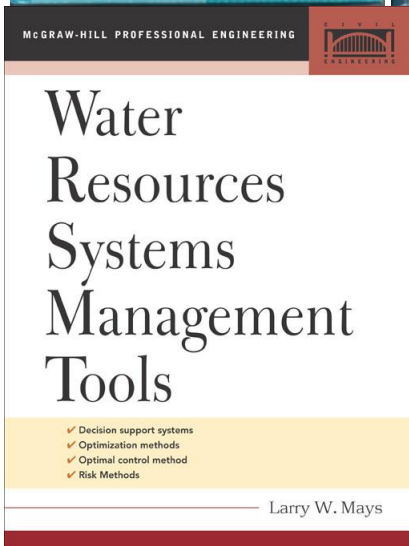
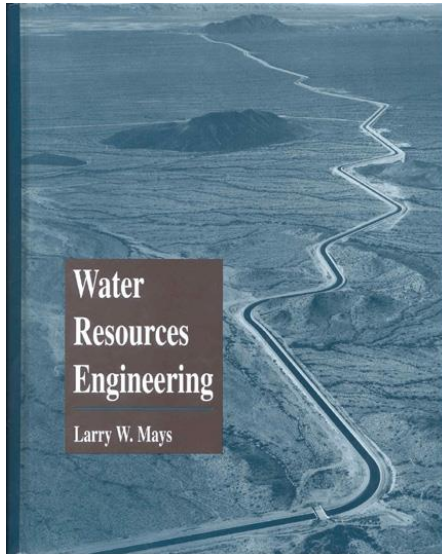
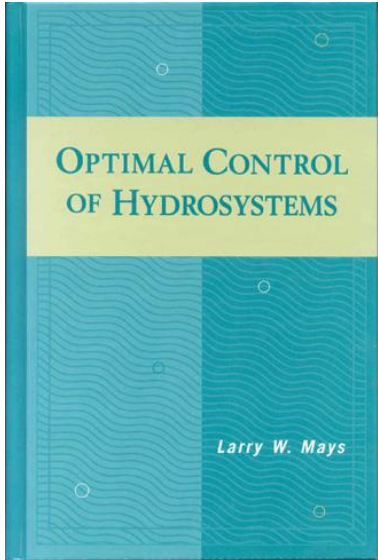
*Evolution of Water Supply Through the Millennia, by Angelakis, Mays, Koutsoyiannis and Mamassis, 584 p, ISBN 9781843395409*

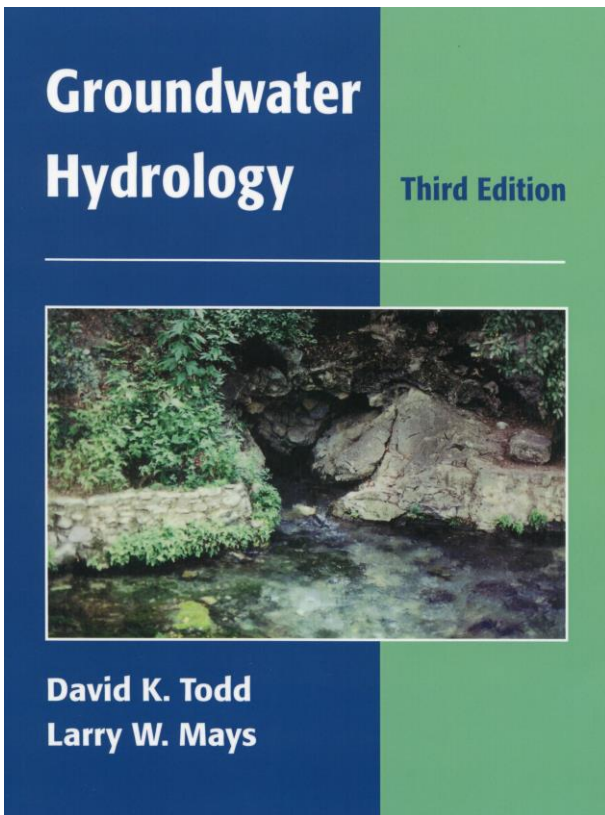
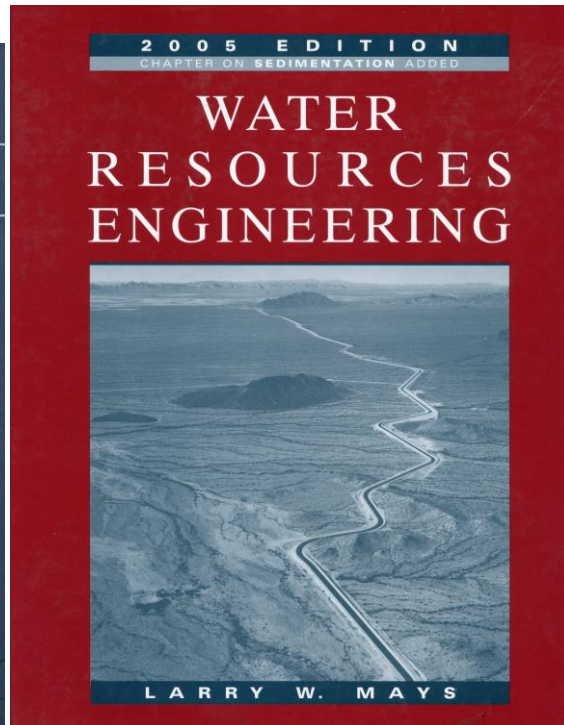
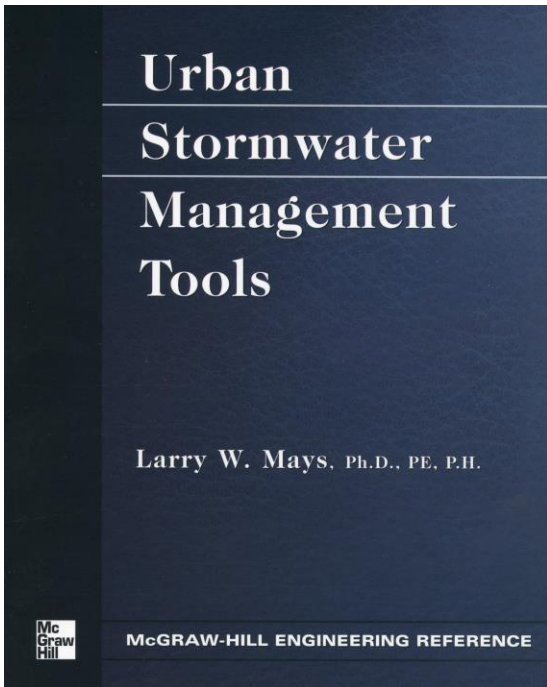
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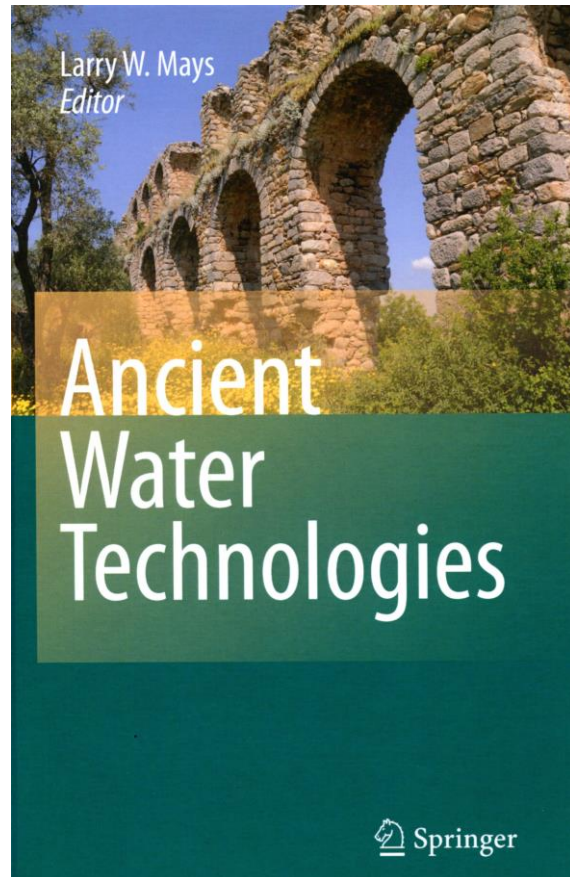
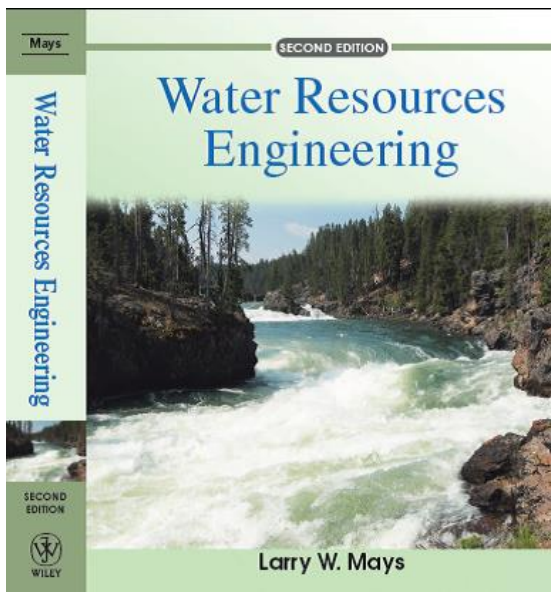
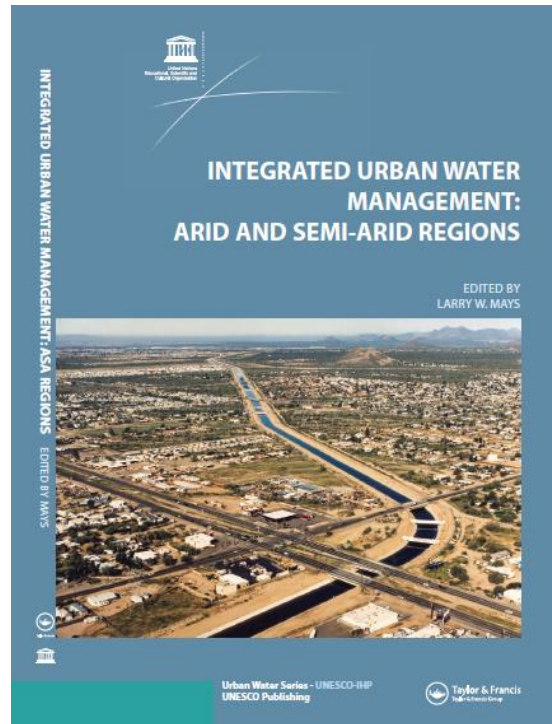
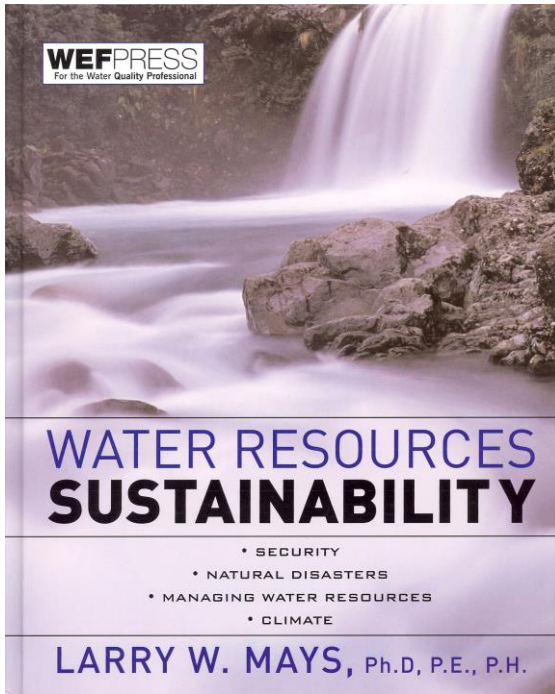
Books by Larry W. Mays

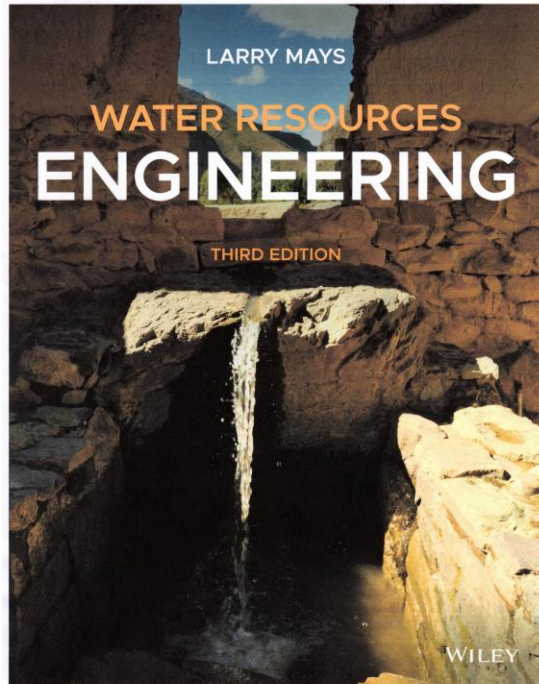
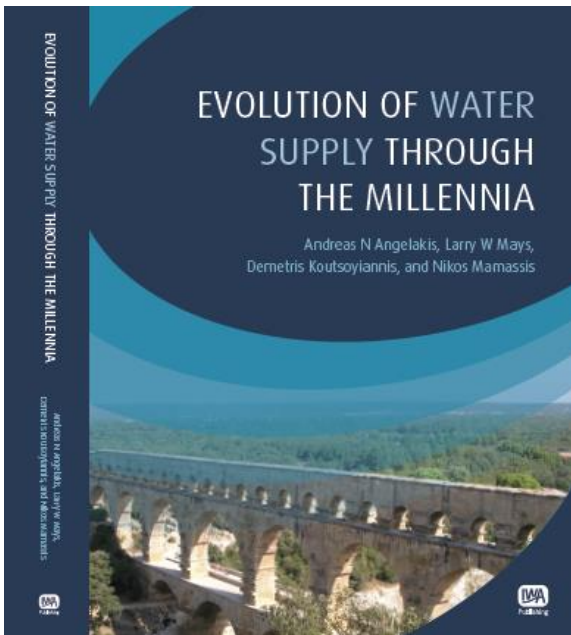
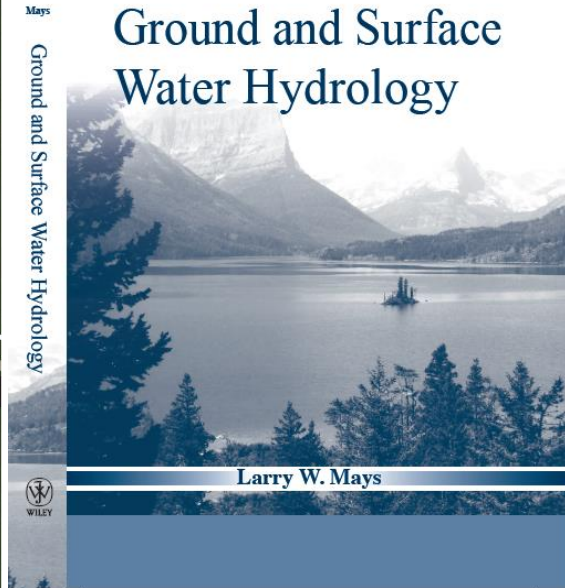
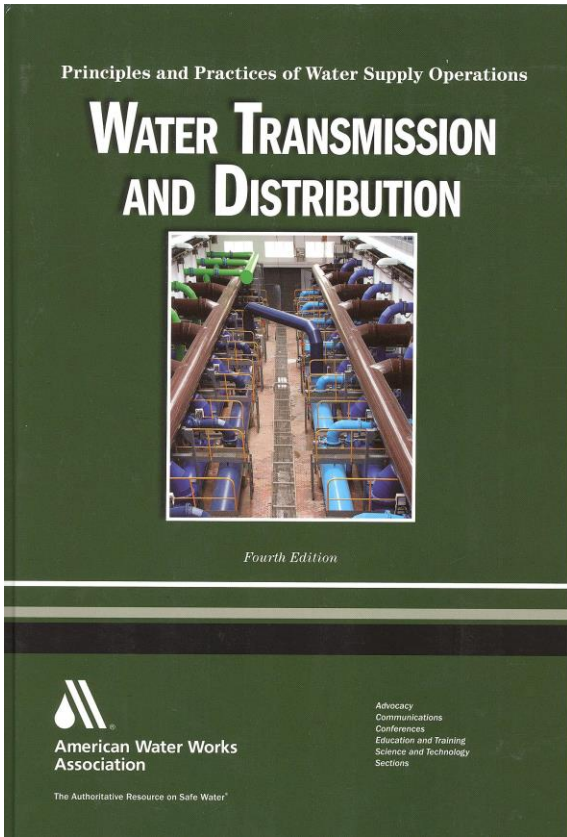












## **CHAPTERS IN BOOKS THAT L.W. MAYS WAS EDITOR**

Reliability Analysis of Water Distribution Systems, L. W. Mays, Editor, ASCE, 1989.

Mays, L.W., Introduction, Chapter 1, pp.1-10

Lansey, K.E. and L.W. Mays, Network Simulation Models, Chapter 2, pp. 11-36

Lansey, K.E. and L.W. Mays, Optimization Models for Design of Water Distribution Systems, Chapter 3, pp.37-84

Goodrich, J., L.W. Mays, Y.C. Su, and J. Woodburn, Data Base Management Systems, Chapter 5, pp. 123-162

Mays, L.W., Y.K. Tung, and M.J. Cullinane, Jr., Methods for Component Reliability Analysis, Chapter 6, pp. 163-189

Tung, Y.K., and L.W. Mays, Reliability Analysis using Load-Resistance Analysis, Chapter 8, pp. 247-259

Tung, Y.K., L.W. Mays, and M.J. Cullinane, Jr., Reliability Analysis of Systems, Chapter 9, pp. 260-298

Duan, N. and L.W. Mays, Reliability Analysis of Pumping Stations and Storage, Chapter 12, pp. 389-432

Lansey, K.E., L.W. Mays, J. Woodburn, and W.O. Wunderlich, Methods to Analyze Replacement-Rehabilitation of Water Distribution System Components, Chapter 13, pp. 433-472

Bouchart, F., N. Duan, I. Goulter, K.E. Lansey, L.W. Mays, Y.C. Su, and Y.K. Tung, Reliability-Optimization Based Models, Chapter 14, pp. 473-532

Computer Modeling of Free-Surface and Pressurized Flow, Co-editor with M.H. Chaudhry, Kluwer Academic Publications, 1994.

Mays, L.W., Methodologies for Reliability Analysis of Water Distribution Systems, Chapter 17, pp. 485-518

Water Resources Handbook, Larry W. Mays, Editor-in-Chief, McGraw-Hill, 1996.

Mays, L.W., Water Resources: An Introduction, Chapter 1, pp. 1.1-1.35

Mays, L.W. and Y.K. Tung, Systems Analysis, Chapter 6, pp. 6.1-6.50



Hinks, R.W. and L.W. Mays, Hydrology for Water Excess Management, Chapter 24, pp. 24.3-24.48

Hydraulic Design Handbook, Larry W. Mays, Editor-in-Chief, McGraw-Hill Book Co., 1999.

Mays, L.W., Introduction, Chapter 1, pp. 1.1-1.39

Lansey, K. and L.W. Mays, Hydraulics of Water Distribution Systems, Chapter 9, pp. 9.1-9.38

Tuncok, I.K., Hydraulic Design of Culverts and Highway Structures, Chapter 15, pp. 15.1-15.71

Mays, L.W., Flow Transitions and Energy Dissipators for Culverts and Channels, Chapter 20, pp. 20.1-20.26

Water Distribution Systems Handbook, Larry W. Mays, Editor-in-Chief, McGraw-Hill Book Co., 2000.

Mays, L.W., Introduction, Chapter 1, pp. 1.1-1.30

Lansey, K. and L.W. Mays, Hydraulics of Water Distribution Systems, Chapter 4, pp. 4.1-4.29

Goldman, G.E., B. Sakarya, L. Ormsbee, J. Uber, and L.W. Mays, Optimization Models for Operations, Chapter 16, pp. 16.1-16.47

Goulter, I., T.M. Walski, L.W. Mays, B. Sakarya, F. Bouchart, and Y.K. Tung, Reliability Analysis for Design, Chapter 18, pp.18.1-18.52

Stormwater Collection Systems Design Handbook, L. W. Mays, Editor-in-Chief, McGraw-Hill, 2001.

Mays, L.W., Introduction, Chapter 1, 1.1-1.53

Tuncok, I.K. and L.W. Mays, Design of Culverts and Highway Structures, Chapter 15, pp. 15.1-15.68

Mays, L.W., Storm and Combined Sewer Overflow: Flow Regulators and Control, Chapter 18, pp. 18.1-18.36

Mays, L.W., Design of flow Transitions and Energy Dissipators for Culverts and Channels, Chapter 20, pp. 20.1-20.41

- Tung, Y.K., L.W. Mays, and B.C. Yen, Risk/Reliability Models for Design, Chapter 22, pp. 22.1-22.27
- Urban Water Supply Handbook, Larry W. Mays, Editor-in-Chief, McGraw-Hill Book Co., 2002.
- Mays, L.W., History, Urban Water Infrastructure: A Historical Perspective, Chapter 1, pp. 1.1-1.66
- Ejeta, M.Z. and L.W. Mays, Water Pricing and Drought Management, Chapter 6, pp. 6.1-6.43
- Ejeta, M.Z. and L.W. Mays, Computer Programs for Integrated Management, Chapter 7, pp. 7.1-7.36
- Ejeta, M.Z. and L.W. Mays, Regional Water Supply Planning and Capacity Expansion Models, Chapter 8, pp. 8.1-8.42
- Lansley, K., L.W. Mays, and Y.K. Tung, Reliability and Availability of Water Distribution Systems, Chapter 10, pp. 10.1-10.40
- Goldman, F.E., A.B.A. Sakarya, and L.W. Mays, Optimal Operation of Water Systems, Chapter 12, pp. 12.1-12.39
- Urban Stormwater Management Tools, Larry W. Mays, Editor-in-Chief, McGraw-Hill, 2004 (Book was dedicated to Ben C. Yen).
- Hinks, R.W. and L.W. Mays, Hydrology for Water Excess Management, Chapter 1, pp. 1.1-1.41
- Tung, Y.K., L.W. Mays, and B.C. Yen, Risk/Reliability Models for Design, Chapter 7, pp. 7.1-7.25
- Urban Water Supply Management Tools, Larry W. Mays, Editor-in-Chief, McGraw-Hill, 2004.
- Ejeta, M.Z. and L.W. Mays, Water Pricing and Drought Management, Chapter 2, pp. 2.1-2.2.34
- Ejeta, M.Z. and L.W. Mays, Computer Programs for Integrated Management, Chapter 3, pp. 3.1-3.26
- Goldman, F.E., A.B.A. Sakarya, and L.W. Mays, Optimal Operation of Water Systems, Chapter 5, pp. 5.1-5.29

Lansley, K., L.W. Mays, and Y.K. Tung, Reliability and Availability of Water Distribution Systems, Chapter 6, pp. 6.1-6.31

Mays, L.W., Climate Change Effects and Water Management Options, Chapter 8, pp. 8.1-8.18

Mays, L.W., Water Supply Safety and Security: An Introduction, Chapter 9, pp. 9.1-9.45

Water Supply Systems Security, Larry W. Mays, Editor-in-Chief, McGraw-Hill, 2004.

Mays, L.W., Water Supply Security: An Introduction, Chapter 1, pp. 1.1-1.12

Mays, L.W., Vulnerability, Assessment, Emergency Response Planning: Summary of What's Available, Chapter 3, pp. 3.1-3.42

Tung, Y.K. and L.W. Mays, Methodologies for Reliability Analysis, Chapter 7, pp. 7.1-7.23

Ozger, S. and L.W. Mays, Optimal Location of Isolation Valves: A Reliability Approach, Chapter 13, pp. 13.1-13.30

Water Resources Systems Management Tools, L. W. Mays, Editor-in-Chief, McGraw-Hill, 2005.

Mays, L.W. and Y.K. Tung, Systems Analysis, Chapter 1, pp.1.1-1.52

Ejeta, M.Z. and L.W. Mays, Regional Water Supply Planning and Capacity Expansion Models, Chapter 3, pp. 3.1-3.35

Goldman, F.E. and L.W. Mays, Water Distribution Operation: Application of Simulated Annealing, Chapter 5, pp. 5.1-5.17

Ozger, S. and L.W. Mays, Optimal Location of Isolation Valves: A Reliability Approach, Chapter 7, pp. 7.1-7.27

Skaggs, R.L. and L.W. Mays, Groundwater Remediation Design Using Simulated Annealing, Chapter 8, pp. 8.1-8.24

Water Resources Sustainability, L. W. Mays, Editor-in-Chief and author of five chapters, McGraw-Hill, New York, 2007.

Introduction: Water Sustainability, Chapter 1, pp. 1-18

Water Sustainability: Parallels of Past Civilizations and the Present, Chapter 2, 19-54

Climate Change Effects and Water Management Options, Chapter 8, pp. 159-180

Water Supply Security: An Introduction, Chapter 10, pp. 193-206

Integrated Urban Water Management in Arid and Semi-Arid Regions, L.W. Mays, *Editor-in-Chief and author of six chapters, for UNESCO-IHP, published by Taylor and Francis, London, 2009.*

Introduction, Chapter 1, pp. 1-16

Arid and Semi-Arid Regions: What Makes them Different?, Chapter 2, pp. 17-26  
Integrated Water Supply Management in Arid and Semi-Arid Regions, Chapter 3, pp. 27-46

Integrated Water Excess Management in Arid and Semi-arid Regions, Chapter 4, pp. 47-58

Interactions and Issues of Urban Water Management, Chapter 5, pp. 59-70  
Opportunities and Challenges, Chapter 6, pp. 71-80

Ancient Water Technologies, L.W. Mays, Editor-in-Chief and author or co-author of five chapters, Springer, Dordrecht, 2010

A Brief History of Water Technology during Antiquity: Before the Romans, Chapter 1, pp. 1-28

Water Technology in Ancient Egypt, Chapter 3, pp. 53-66

A Brief History of Roman Water Technology, Chapter 7, pp. 115-138,

Mays, L.W. and Y. Gorokhovich, Water Technology in the Ancient American Societies, Chapter 9, pp. 171-200

Lessons from the Ancients on Water Resources Sustainability, Chapter 11, pp. 217-241.

The Evolution of Water Supply Through the Millennia, Editors: A. N Angelakis, L. W Mays, D. Koutsoyiannis, and N. Mamassis, International Water Association (IWA) Publishing, 2012.

A.N. Angelakis, L. W Mays, D. Koutsoyiannis, and N. Mamassis, Prolegomena, The Evolution of Water Supply Through the Millennia, International Water Association, 2012.

L.W. Mays and A.N. Angelakis, Chapter 1, Ancient gods and goddesses of water, The Evolution of Water Supply Through the Millennia, International Water Association, 2012.

L. W. Mays, M. Sklivaniotis, and A. N. Angelakis, Chapter 2, Water for human consumption through history, The Evolution of Water Supply Through the Millennia, International Water Association, 2012.

G. De Feo, P. Laureano, L. W. Mays, and A. N. Angelakis, Chapter 14, Water Supply Management Technologies in the Ancient Greek and Roman Civilizations, The Evolution of Water Supply Through the Millennia, International Water Association, 2012.

L.W. Mays, Chapter 15, Water Supply of Ancient Civilizations in Mesoamerica and the American Southwest, The Evolution of Water Supply Through the Millennia, International Water Association, 2012.

Andreas N. Angelakis, Larry W. Mays, Demetris Koutsoyiannis, Nikos Manassis, Nikos Zarkadoulas, Chapter 21, The Evolution of Water Supply Throughout the Millennia: A short overview, The Evolution of Water Supply Through the Millennia, International Water Association, 2012.

## **PROFESSIONAL AFFILIATIONS**

American Society of Civil Engineers, 1970-present, Fellow and Lifetime Member  
ASCE--Texas Section (Secretary, Vice Chairman, and Chairman of Hydraulics  
Group), 1977-1980

Referee for numerous technical journals

- Committees:
- a) Publications - Water Resource Planning and Management Division, ASCE (1982-1986)
  - b) Water Resource Systems - Water Resource Planning and Management Division, ASCE (1982-present)
  - c) Technical Committee on Probabilistic Approach to Hydraulics Division, ASCE (1982-present), Chairman (1985)
  - d) Chairman, Task Committee on Risk Analysis for Water Distribution Systems (1985-1987)
  - e) Task Committee on Optimal Operation of Water Distribution Systems
  - f) Task Committee on Maintenance of Hydraulic Structures

Civil Engineers Department Heads Council

Universities Council on Water Resources (Board of Directors, 1991-1995)

President UCOWR, 1994

Arizona Society of Professional Engineers, Water Resources Committee

Arizona Water Pollution Control Federation Quentin Mees Award Committee

Technical Management Committee, Southwest Center for Environmental  
Research and Policy

Ad Hoc Technical Advisory Committee, Scottsdale Water Campus, Scottsdale.

American Society of Engineering Education

International Association of Hydraulic Research

International Water Association

International Water History Association.

## **VISITING APPOINTMENTS**

University of Lisbon, and National Civil Engineering Laboratory of Portugal. Presented series of lectures on water resource system analysis, November 1986.

National Chiao Tung University, sponsored by Taiwan Water Planning Commission and Water Conservancy Board. Presented series 35 hours of lectures in 6 days on unsteady flow modelling using DAMBRK and DWOPER, May 1987.

New University of Lisbon, Portugal. Presented series of lectures on water resource system analysis, March 1995.

Braun Institute Visiting Professor at the University of Minnesota, Presented a series of lectures on risk analysis, January 1996.

## BIOGRAPHIES

Outstanding Young Men of America  
Who's Who in the South and Southwest  
Who's Who in America, 2001  
Who's Who in the World, 2003  
American Men and Women of Science  
Dictionary of International Biography  
Personalities of America  
Men and Women of Distinction

## HONORS

Chi Epsilon  
Chi Gamma Iota  
Sigma Xi  
University of Texas Engineering Foundation Award  
Cockrell Centennial Teaching Fellowship, University of Texas at Austin, 1983-86  
Honorary Member of Editorial Board, International Journal of Hydroelectric Energy, Wuhan Province, Peoples Republic of China  
Engineering Foundation Endowed Professorship at University of Texas 1987-1989  
**Certificate of Commendation for Outstanding Achievement in the Field of Water Resources** presented by the National Association of Water Institute Directors and the National Association of State University and Land Grant Colleges, 1989  
**Engineer of the Year in Education Award**, Arizona Society of Professional Engineers, 1992.  
**Quentin Mees Research Award**, Arizona Water and Pollution Control Association, 1993.  
**Universities Council on Water Resources: Board of Directors (1992-1996) and President 1994-1995.**  
**Certificate of Commendation**, City of Tucson, Arizona, Completion of Soil Aquifer Investigation, January 1997.  
Order of the Engineer, 1999  
**Distinguished Alumnus Award, Department of Civil Engineering, University of Illinois, 1999**  
**Elected Fellow of American Society of Civil Engineers (F. ASCE), 2000**  
**Elected Fellow of International Water Resources Association (F. IWRA), 2000**  
Association of American Publishers PSP Award (Honorable Mention in Engineering for Urban Water Supply Handbook), 2002  
Elected **Diplomat, Water Resources Engineer (D.WRE)**, American Academy of Water Resources Engineering (AAWRE), 2007  
**Lifetime Member of ASCE, 2013**

**G.V. Loganathan Distinguished Lecture**, April 24, 2014, Realities of Water Resources Sustainability during the Past and the Present: Can Ancient Water Technologies and Traditional Knowledge Along with Modern Technologies Help the Poor in the Future?" *The G.V. Loganathan 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.*

**ASCE Julian Hinds Award (2014)** - The award citation read: "*For his research on water resources and hydro systems addressing optimization and risk/reliability analysis for their design, management and operation, and his authoritative text and reference books that have had world-wide impact.*" In selecting you for this award, the committee particularly noted your impressive body of research.

**Prince Sultan Bin Abdulaziz International Prize for Water – Surface Water Prize, (2014)** December 2014, Riyadh, Saudi Arabia. "The Surface Water Prize is awarded for his comprehensive work in surface water hydrology and water resources engineering, culminating in three leading and innovative textbooks in the field, and for his applying this extensive knowledge base to develop optimization models in practical hydrology for current problems, including real-time optimal dam release during flood conditions and watershed development in urban areas."

**2015 Warren E. Hall Medal** presented by the Universities Council on Water Resources (UCOWR) in June 2015. The Warren A. Hall Medal, named in honor of one of the council's founders and a well-known leader in water resources research and education, honors those with distinctive records of advancing knowledge in the area – particularly teachers who have demonstrated a strong commitment to the education of students.

2016 Elected **Fellow** of the **International Water Association**

In April 2016 he was inducted into the **Academy of Civil Engineers** of the Missouri University of Science and Technology (MUST)

In May 2016 he received the **ASCE Ven Te Chow Award** for "exceptional achievement and significant contributions in research, education and practice" in the field of hydrologic engineering. The award recognizes Mays' research on watersheds, water infrastructure and hydrological systems, encompassing every aspect of their design, management and operations. His popular and authoritative water engineering textbooks and technical handbooks were also noted by the ASCE for their influence on water resources engineers throughout the world.



## **INTERNATIONAL CONSULTING, LECTURING, and FIELD TRIPS**

1. United Nations, Government of India. Presented series of lectures on water resource systems analysis at Center for Water and Power Research, Pune, India, May 1985.
2. World Bank. Wrote manual on use of unsteady flow routing models for analyzing irrigation systems and performed preliminary modeling of the Bhakra Main Irrigation Canal in India.
3. NATO, University of Lisbon, and National Civil Engineering Laboratory of Portugal. Presented series of lectures on water resource system analysis, November 1986.
4. United Nations, Government of India. Lectured on use of DAMBRK and DWOPER codes and advised on modeling Mahanadi River Delta at Central Water and Power Research Station, Pune, India, January 1987.
5. Republic of China, Taiwan Water Planning Commission and Water Conservancy Board. Presented series 35 hours of lectures in 6 days on unsteady flow modelling using DAMBRK and DWOPER, May 1987.
6. Invited lecture on Unsteady Flow Modelling and Real-Time Reservoir Operation at Tokyo Metropolitan University, June 1, 1987.
7. Invited lecture at U.S.-Taiwan Joint Seminar on Rehabilitation of Public Works, "Development of Methodologies for the Optimal Rehabilitation and Analysis of Aging Water Distribution System," held in Taipei, Republic of China, January 11-15, 1988.
8. V. I. Lenin Georgian Polytechnic Institute, Tbilisi, Georgia, U.S.S.R. Presented lectures on water resources research at the University of Texas at Austin, December 7-16, 1988.
9. Tschinghua University, Beijing, China, October, 1991.  
Chinese Research Academy of Environmental Sciences, Beijing, China, October, 1991. Tongji University, Shanghai, China, October, 1991.
10. Keynote address, Recent Developments in Hydrosystems for the 35th Annual Symposium of the Korean Association of Hydrological Sciences, Korea, July 10, 1993. Invited lecture, "Hydrosystems Engineering: Simulation vs. Optimization," Korean Institute of Construction Technology, Seoul, Korea, July 12, 1993.

11. Southeastern Anatolya Project, Turkey, Invited Delegate by Government of Turkey to Opening Ceremonies of Irrigation Canals, Nov. 1994.
12. Technion, Haifa, Israel, Presented lecture on Soil Aquifer Treatment Research in Arizona, Jan. 1995. Presented talk at Dan Region Sewage Disposal and Reclamation Plant, Mekorot Water Co., Ltd. Tel Aviv, Israel, Jan. 1995.
13. New University of Lisbon, Portugal. Presented series of lectures on water resource system analysis, March 1995.
14. Seoul National University, Korea, Joint International Seminar on Reduction of Natural and Environmental Disasters in Water Environment sponsored by the U.S. National Science Foundation and the Korean Government. July, 1995.
15. Iraklio, Crete, Greece, International Association of Water Quality, Optimization of Soil Aquifer Treatment System, Oct. 1995.
16. Mackay, Australia, International Association of Hydraulic Research, Seventh Symposium on Stochastic Hydraulics, July 1996.
17. Universidad Internacional Menendez Pelayo, International course on Drought Management Planning in Water Supply Systems, Valencia, Spain, Dec. 1997.
18. "New Methodologies for Optimal Operation of Water Distribution Systems for Water Quality Purposes," Hydrosoft 98 sponsored by Wessex Institute of Technology, held in Villo Como, Italy, September 1998.
19. "Regional Water System Development and Management in the U. S. Southwest," International Conference on Integrated Water Management, Universidad Internacional Menendez Pelayo, Valencia, Spain, November 1998.
20. "Computer Models for Integrated Hydrosystems Management," International Conference on Integrated Water Management, Universidad Internacional Menendez Pelayo, Valencia, Spain, November 1998.
21. "Regional Water System Development and Management in the U. S. Southwest," International Conference on Integrated Water Management, Universidad Internacional Menendez Pelayo, Valencia, Spain, November 1998.
22. "Computer Models for Integrated Hydrosystems Management," International Conference on Integrated Water Management, Universidad Internacional Menendez Pelayo, Valencia, Spain, November 1998.

23. Future Trends in the Technical Management of Water Distribution Systems: The Optimal Operation, Conference held at the Universidad Politecnica de Valencia, Spain, June 2001.
24. “Effects of Climate Change on Hydraulic Resources”, invited talk and paper for the International Symposium on Challenges of the New Water Policies for the XXI Century at the Universidad Internacional Menendez Pelayo, Valencia, Spain, October 2002.
25. Water Sustainability, Taipei, Taiwan, Dec. 2003.
26. Consultant to United Arab Emirates University in Al Ain to review the water resources engineering program, 2004.
27. Visited the El Shalom Project in the Sinai and the hydraulic structures that pump the water under the Suez Canal. Also presented the talk “Stormwater Management in Arid and Semi-Arid Regions,” UNESCO, Cairo, Egypt, Nov. 2005. Trip sponsored by UNESCO.
27. “Water Sustainability: Parallels of Past Civilizations and the Present,” presented at the International Water History Association (IWHA) conference held at the UNESCO Headquarters in Paris, France, Dec. 2 – 4, 2005.
28. “Water Engineering and Management in Ancient Egypt,” Introduccio a La Historia de La Ingenieria Y De La Gestion Del Agua. Objectivos del Curso, Alicante, Spain, May 2006.
29. “Integrated Urban Water Management in Arid and Semi-Arid Regions,” UNESCO, Paris, France, June 2006.
30. “A Brief History of Ancient Water Distribution,” Keynote address to be given at the IWA International Symposium on Water and Wastewater Technologies in Ancient Civilizations, Iraklio, Crete, Greece, Oct. 2006.
31. “Water Sustainability of Ancient Civilizations in Mesoamerica and the American Southwest, IWA International Symposium on Water and Wastewater Technologies in Ancient Civilizations, Iraklio, Crete, Greece, Oct. 2006.
32. “Realities of Water Resources Sustainability,” Invited Talk, IWA-Croucher Foundation Advanced Study Institute, Sustainability of Water Environment and Water Resources, Hong Kong University of Science and Technology, Hong Kong, June 23-27 June 2008.

33. Field trip to Athens, Greece, Islands of Crete and Santarini, and numerous sites along the Turkish Coast of the Aegean Sea to investigate numerous ancient water systems of the ancient Minoans, Greeks and Romans, May 2009.
34. Water Resources Sustainability and Traditional Knowledge, Invited talk, IPOGEA, Florence, Italy, July 2009. Trip to United Nations World Water Assessment Program Headquarters in Perugia, Italy.
35. Field trip to Rome, Italy and Pompei, Piscina Mirabilis, and Herculaneum to investigate water systems of the ancient Greeks and Romans, March 2010.
36. A History of Water Supply throughout the Millennia, Invited talk, Universidad Politecnica de Valencia, Valencia, Spain, Feb. 2011.
37. Field trip to various Roman sites in Spain (Chuelva aqueduct, Segovia aqueduct, Consuegra Dam, and Alcantarilla Dam), Feb. 2011.
38. Keynote address, "Ancient gods and goddesses of water," 3<sup>rd</sup> Annual International Water Association Specialized Conference on Water and Wastewater Technologies in Ancient Civilizations, Istanbul, Turkey, March 22, 2012.
39. Association Specialized Conference on Water and Wastewater Technologies in Ancient Civilizations, Istanbul, Turkey, March 23, 2012.
40. A Brief History of Water Filtration/Sedimentation, 3<sup>rd</sup> Annual International Water Association Specialized Conference on Water and Wastewater Technologies in Ancient Civilizations, March 23, 2012.
41. Field trip to ancient sites of Aspendos, Side, Perge, and Termessos in Turkey, March 2012.
42. Field trip to ancient Mayan sites in Guatemala (Tikal) and Belize (Coracol, Zunantunich, Cahal Pech, Santa Rita, Cerros, and Lamanai), April 29 – May 5, 2012.
43. Field trip to pre-Inca and Inca sites in Peru including Cuzco, Machu Picchu, Ollantaytambo, Tipon, Pisac, Sacsayhuaman, Puca Pucara, Qenko, Chinchera, Tambo Machey, Moray, Romicola, and Pikillacta, 2013.
44. Field trip to Jordan to ancient Nabataean sites of Petra and Humayma, and Roman sites at Jerash and Maddaba, March, 2014.
45. Field trip to Riyadh, Saudi Arabia to receive the the Prince Sultan Bin Abdulaziz zinternational Prize for Water – Surface Water Prize (December 14,

- 2014) and to present a keynote address at the 6<sup>th</sup> Internal Conference on Water Resources and Arid Environments (ICWRAE) (December 15, 2014).
46. Field trip to Southeast Asia including Vietnam, Cambodia, and Thailand. Visited several ancient sites of the Khmer Civilization in Cambodia including Angkor, May 2015.
  47. Field trip to Panama, Ecuador, and Columbia, December 2015.
  48. Field trip to Eastern Europe driving through several (nine) countries. We started in Vienna, Austria then to Prague in the Czech Republic for a couple evenings, then to Krakow, Poland from where we traveled to Auschwitz/Birkenau. After Krakow we traveled through Slovakia to Budapest, Hungary for a couple evenings then to Belgrade, Serbia for another couple evenings. From Belgrade, we drove to Banja Luka, Bosnia for an evening then to Zagreb, Croatia for a couple evenings. From Zagreb we traveled through Slovenia to Salzburg, Austria for an evening and then back to Vienna. In each city we stayed in the old parts. This trip included a lot of photography, excellent food complimented with fine wine and beer. We met a lot of very friendly people in these countries.
  49. Field trip to Lisbon and Coimbra, Portugal, then to Merrekash, Morocco into the Atlas Mountains, and then to Bath, England. Photography of ancient sites at all locations.
  50. Consulting on modeling of the hydrology and hydraulic modeling of the Northwest watershed project in Guayaquil, Ecuador for international consortium of Interagua / Greeley and Hansen. June 2017
  51. Lectured at ASCE sponsored workshop at ESPOL - Escuela Superior Politecnica del Litoral in Guayaquil, Ecuador. Presented a series of lectures on stormwater management and floodplain management.
  52. Field trip to Nasca, Peru to photograph the ancient water structures called puquios. June 2017.
  53. I presented an invited talk “**A Survey of Ancient Water Technologies in Arid and Semi-Arid Regions**” at the International Conference on Karez on Cultural Borders in Bidar, India sponsored by UNESCO New Delhi, Indian Heritage Cities Network Foundation (IHCN-F), and the Department of Tourism Government of Karnataka, India October 30, 2017.
  54. Presented the opening keynote address, “**Water-Wise Cities: Future of Modeling Real-time Operation of Water Distribution Systems under Limited Electrical Energy Input and Limited Water Availability,**” in Izmir

at the International Conference on Water-Smart Cities held in Izmir Turkey, November 2, 2017.

55. Field trip to the Greek Island Samos to photograph the ancient Eupolinus Tunnel and the ancient city of Samos. Also visited the ancient city of Ephesus to photograph ancient water structures near Kusadasi and ancient of Smyrna in Izmir, Turkey. October 2017.
56. Field trip to photograph the ancient Karez system in Bidar, India. November 2017.
57. Luncheon Speaker, 11<sup>th</sup> International Conference on Irrigation and Drainage, USCID, “Ancient Water Technologies,” Mesa, Arizona, October 18, 2018.
58. Presented a keynote address, “Ancient Water Technologies” at the over 2,000+ year-old Greek theater in ancient Stratonikeia, near Mugla, Turkey. October 23, 2018.
59. Presented keynote address at the International Symposium on Urban Water and Wastewater Management at Pamukkale, Denizli, Turkey titled “Models for Real-time Operation of Urban Water Delivery Systems under Limited Electrical Energy and/or Water Availability.” October 25, 2018.
60. Field trip to ancient Hieropolis and Laodikeia and Stardis for photography. October 2018
61. Field trip to Varna, Bulgaria to photograph ancient Odessos. Also visited Bucharest, Romania. October 2018.
62. Presented invited keynote address at the United Arab Emirates University (UAEU) Annual Research and Innovation Conference titled “Water Engineering in Arid and Semi-Arid Regions: Ancient to the Present.” Feb 6, 2019.
63. Field trip to study falaj systems in Oman. (Feb. 7-9, 2019)
  - Falaj Saarani – Al Baraimi, Oman
  - Falaj Darius – Nizwa, Oman
  - Falaj Khatmain – Birket Al Mouz, Oman
  - Falaj Al Malki – Izki, Oman
  - Falaj Farfarah – Bidbid, Oman
  - Falaj Al Khaudh Village – near Muscat, Oman

## **DIVING CERTIFICATIONS**

1. Scuba Diver, NAUI, Registration No. 754079.
2. International Open Water Diver, PADI, Registration No. 82212056.
3. Advanced International Open Water Diver, PADI, Registration No. 82291428.

## **COURSES TAUGHT**

(The University of Texas at Austin)

1. Elementary Fluid Mechanics (undergraduate)
2. Elements of Hydraulic Engineering (undergraduate)
3. Hydrology (undergraduate)
4. Hydraulic Structure Design (undergraduate)
5. Water Resources Planning and Management (graduate)
6. Water Resources Systems Analysis (graduate)
7. Surface Water Hydrology (graduate)

(Arizona State University)

1. Water Resources System Analysis I (graduate)
2. Water Resources System Analysis II (graduate)
3. Surface Water Hydrology (graduate)
4. Free Surface Flow (graduate)
5. Infrastructure Management (undergraduate)
6. Water Resources Engineering (undergraduate/graduate)
7. Engineering Hydrology (undergraduate/graduate)
8. Integrated Design (undergraduate)
9. Groundwater Hydrology (graduate)
10. Urban Water Systems (undergraduate/graduate)
11. Fluid Mechanics (undergraduate)
12. Water Resources Sustainability (graduate)

## **CONTINUING ENGINEERING SHORT COURSES**

- Flood Plain Hydrology using HEC-1, developed and supervised by Larry W. Mays.
- Unsteady Flow Modeling using DAMBRK and DWOPER, developed and supervised by Larry W. Mays.
- Flood Plain Hydraulics using HEC-2, developed and supervised by Larry W. Mays.
- Sedimentation Engineering Using HEC-6, developed and supervised by Larry W. Mays.

**ORAL PRESENTATIONS** (Professional and Technical Societies, National and International Meetings)

1. "Optimal Risk-Based design of Storm Sewer Networks," presented at the 45th National ORSA/TIMS Meeting in Boston, Massachusetts, April 22-24, 1974.
2. "Application of a Model for Layout and Design of Sewer Systems," presented in the Special Session on Utility of Urban Runoff Modeling, Spring Annual Meeting, American Geophysical Union, Washington, D.C., April 14, 1976.
3. "State Variable Model for Sewer Network Flow Routing," presented at the 1976 Fall Annual Meeting of the American Geophysical Union in San Francisco, California, December 10, 1976.
4. "Models for Optimal Design of Sewer Systems," presented at the Tri-Sectional Meeting, Mexico, New Mexico, and Texas Sections of the American Society of Civil Engineers in Albuquerque, New Mexico, Oct. 6-8, 1977.
5. "A New Model for Analyzing the Urban Rainfall-Runoff Process," with Y. K. Tung, presented at the Texas Section, American Society of Civil Engineers, Corpus Christi, Texas, April 6-8, 1978.
6. "Optimal Risk-Based Design of Water Resource Projects," presented at the International Symposium on Risk and Reliability in Water Resources, University of Waterloo, Waterloo, Ontario, Canada, June 26-28, 1978.
7. "Optimization of Unit Hydrograph Determination," presented at the Texas Section, American Society of Civil Engineers, Lubbock, Texas, October 5-7, 1978.
8. "Urban Hydraulic Structure Design: Risk and Reliability Analysis," presented at the 1978 Fall Annual Meeting of the American Geophysical Union in San Francisco, California, December 7, 1978.]
9. "State Variable Modeling in Water Resources," presented at WATER SYSTEMS 79, Specialty Conference of the American Society of Civil Engineers, Water Resources Planning and Management Division, Houston, Texas, February 25-28, 1979.



10. "Risk-Based Design of Hydraulic Structures," presented at the Texas Section, American Society of Civil Engineers, Texas A&M University, October 5, 1979.
11. "Flood Flow Frequency: Where Do We Go From Here?" invited speaker for panel discussion at the American Water Resources Association Symposium on Flood Plain Problems - Planning and Management, Austin, Texas, December 7, 1979.
12. "Models for Optimal Water Reuse Planning and for Optimal Region Water-Energy Systems," guest lecturer at Rice University, Houston, Texas, May 9, 1980.
13. "Hydraulic Performance of Culverts with Safety Grates (Research Findings), presented at the Federal Highway Administration (FHWA) Region 6 Hydraulic Conference, El Paso, Texas, July 21-25, 1980.
14. "Model for Planning Water-Energy Systems," presented at the Symposium on Water for Energy, Texas Section, American Water Resources Association, Houston, Texas, December 4, 1980.
15. "Systems Approach to Water Resources," guest speaker at the Second International Civil Engineering Week, Instituto Tecnológico Y de Estudios Superiores de Monterrey, Monterrey, N.L., Mexico, March 5, 1981.
16. "Optimal Risk-Based Design of Hydraulic Structures for Urban Drainage," 2nd International Conference on Urban Storm Drainage, University of Illinois, Urbana-Champaign, Illinois, June 14-19, 1981.
17. "Water Reuse Planning: New Models and Their Application, Water Reuse Symposium II, American Water Works Association, Washington, D. C., August 23-28, 1981.
18. Development of a Large Scale Optimization Model for the Capacity Expansion of Water-Energy Systems, ORSA/TIMS Conference, San Diego, California, October 1982.
19. Water Resource System Optimization, International Engineering Company, San Francisco, California, March 15, 1983.
20. Applications of Water Resource System Analysis. Guest lecturer. University of Nevada at Reno, Nevada, March 17, 1983.
21. "Development of a Model for Determining Optimal Pumping and Recharge of Large Scale Aquifers, Fall Meeting of American Water Resources Association, San Antonio, Texas, October, 1983.

22. "Development of a Model for the Real-time Optimal Operation of the Highland Lakes System for Flood Control, TIMS/ORSA Joint National Meeting, San Francisco, California, May 14, 1984.
23. "Hydraulic Uncertainty in Risk Analysis," ASCE Hydraulics Division Specialty Conference, Water for Resource Development, Coeur d'Alene, Idaho, August 14-17, 1984.
24. "Large-scale Optimization Models for Groundwater Management," presented at Groundwater-Crisis or Opportunity, Center for Research in Water Resources, The University of Texas at Austin and Texas A&M University, San Antonio, Texas, October 1984.
25. "Model for Reliability Analysis of Water Distribution Networks," ASCE Hydraulics Division Specialty Conference, Orlando, Florida, August 12-17, 1985.
26. "Review of Advances in Risk and Reliability Analysis for Hydraulic Structures," Keynote Paper, International Symposium on Flood Frequency and Risk Analysis, Louisiana State University, Baton Rouge, Louisiana, May 14-17, 1986.
27. "Methodology for Modeling Reliability in Optimal Network Design," ASCE, Water Forum '86, Long Beach, California, August 4-6, 1986.
28. "Simulation/Optimization for Water Resources Policy Analysis," Comprehensive River Basin Management, Analysis and Management (APPAM) Research Conference, Lyndon Baines Johnson School of Public Affairs, The University of Texas at Austin, October 21, 1986.
29. Presented a series of lectures on Water Resource Systems analysis at the University of Lisbon, Lisbon, Portugal, sponsored by NATO in November 1986.
30. Presented a series of lectures on Unsteady Flow Modeling Using DAMBRK and DWOPER at The Central Power and Water Research Station, Pune, India, sponsored by the United Nations, December 28, 1986-January 16, 1987.
31. Presented a series of lectures on Unsteady Flow Modeling Using DAMBRK and DWOPER at the National Chiao Tung University, Republic of China, May 20-27, 1987.
32. Invited lecture on Unsteady Flow Modeling and Real-time Reservoir Operation at National Taiwan University, Taipei, Republic of China, May 28, 1987.

33. Invited lecture on Unsteady Flow Modeling and Real-Time Reservoir Operation at Tokyo Metropolitan University, June 1, 1987.
34. "Model for the Optimal Rehabilitation and Replacement of Water Distribution System Components," presented at the American Society of Civil Engineers 1987 National Conference on Hydraulic Engineering, Williamsburg, Virginia, August 1987.
35. Invited lecture at U.S.-Taiwan Joint Seminar on Rehabilitation of Public Works, "Development of Methodologies for the Optimal Rehabilitation and Analysis of Aging Water Distribution System," held in Taipei, Republic of China, January 11-15, 1988.
36. "Water Distribution Systems Analysis Package," in Critical Water Issues and Computer Applications, 15th Annual Water Resources Conference, ASCE, Water Resources Planning and Management Division, Norfolk, Virginia, June 1-3, 1988.
37. "Methodology for the Optimal Reliability-Based Design and Analysis of Pumping Systems for Water Distribution Networks," in Critical Water Issues and Computer Applications, 15th Annual Water Resources Conference, ASCE, Water Resources Planning and Management Division, Norfolk, Virginia, June 1-3, 1988.
38. "Task Committee Report on Reliability Analysis of Water Distribution Systems," National Conference on Hydraulic Engineering, and International Symposium on Model-Prototype Correlations, ASCE, Colorado Springs, Colorado, August 8-12, 1988.
39. "New Methodology for the Optimal Rehabilitation/Replacement of Water Distribution System Components," National Conference on Hydraulic Engineering and International Symposium on Model-Prototype Correlations, ASCE, Colorado Springs, Colorado, August 8-12, 1988.
40. Invited lecture at the Southwest Flood Alert Association Conference, Austin, Texas, September 28-30, 1988.
41. "Hydrosystems Engineering Simulation vs. Optimization - Why Not Both?" Symposium on Systems Analysis for Water Resources Management: Closing the Gap Between Theory and Practice, International Association of Hydrological Sciences Third Scientific Assembly, Baltimore, Maryland, May 10-19, 1989.
42. "Hydraulic Reliability Analysis for Water Distribution Systems Using Monte Carlo Simulation," International Conference on Channel Flow and Catchment

Runoff: Centennial of Manning's Formula and Kuichling's Rational Formula, University of Virginia, May 22-26, 1989.

43. "Optimal Reliability-Based Design and Operation of Pumping Stations," 1989 Water Resources Planning and Management Division Specialty Conference on Water Resources for the Future: The Management Challenge, Sacramento, California, American Society of Civil Engineers, May 21-24, 1989.
44. "Methodology for Optimal Operation of Pumps in Water Distribution Systems," 1989 Water Resources Planning and Management Division Specialty Conference on Water Resources for the Future: The Management Challenge, American society of Civil Engineers, Sacramento, California, May 21-24, 1989.
45. "Global Change and Water Resources," invited talk and panel discussion, Natural Hazards Conference, Boulder, Colorado, July 19, 1989.
46. "Model for Determining the Optimal Rehabilitation and Replacement of Water Distribution System Pipes," National Conference on Hydraulic Engineering, American Society of Civil Engineers, August 14-18, 1989.
47. "Rehabilitation Model for Water Distribution System," National ASCE Symposium on Water Resources Infrastructure: Needs, Economics, and Financing, Ft. Worth, Texas, April 18-20, 1990.
48. "Model for Optimal Maintenance of Hydraulic Structures," National ASCE Symposium on Stochastic Hydraulics, Taipei, Taiwan (Republic of China), May, 1992.
49. "Chance-Constrained Optimization Model for Determining River Discharges to Control Sedimentation," Sixth IAHR International Symposium on Stochastic Hydraulics, Taipei, Taiwan (Republic of China), May, 1992.
50. "Optimization Model for Operation of Recharge Basins," Water Forum 92, Baltimore, Maryland, August 1992.
51. "Model for Determining Optimal Reservoir Releases to Control Downstream Sedimentation Under Uncertainties, Water Form 92, Baltimore, MD, August 1992.
52. "Multi-Objective Models for Determining Freshwater Inflows to Bays and Estuaries," Water Resources Planning and Management Division Meeting, Seattle, WA, May 1993.
53. "Optimal Rehabilitation for Water Distribution System," Water Resources Planning and Management Division Meeting, Seattle, WA, May 5, 1993.

54. "Optimal Rehabilitation Model for Water Distribution Systems," Quentin Mees Research Award lecture presented at the Arizona Water Pollution Control Association Annual Meeting, Tucson, AZ, May 7, 1993.
55. "Discrete-Time Optimal Control of Hydrosystems," invited lecture at U.S.D.A. Water Conservation Laboratory, Phoenix, AZ, May 10, 1993.
56. "Optimal Control Model for Determining Freshwater Inflows to Bays and Estuaries," 1993 National Conference on Hydraulic Engineering, San Francisco, CA, August 1993.
57. "Optimal Control Model for Determining Reservoir Releases to Control Sedimentation," 1993 National Conference on Hydraulic Engineering, San Francisco, CA, August 1993.
58. "Hydraulic Modeling of Alluvial Plains (Slopes) and Alluvial Fans Using DAMBRK," 1993 National Conference on Hydraulic Engineering, San Francisco, CA, Aug. 1993.
59. "Hydrologic and Hydraulic Uncertainty Analysis of Distributory Flows on Alluvial Fans," 1993 National Conference on Hydraulic Engineering, San Francisco, CA, Aug. 1993.
60. "Apportioning Resources Among Scholarly Activities: Department Chair Perspective," 1993 Universities Council on Water Resources (UCOWR) Annual Meeting, U.S. and International Water Resources Education, Session on Scholarship in an Era of Declining Budgets, San Francisco, CA, Aug. 3-6, 1993.
61. "Optimization of Reservoir Releases to Control Sedimentation Using Differential Dynamic Programming," 21st Annual Conference of the ASCE Water Resources Planning and Management Division, Denver, Colorado, May, 1994.
62. "Soil Aquifer Treatment System: Optimal Operation Using Nonlinear Programming Model," 21st Annual Conference of the ASCE Water Resources Planning and Management Division, Denver, Colorado, May 1994.
63. "Integration of Reliability, Uncertainty, and Optimization in Hydraulic System: Design Problems," 21st Annual Conference of the ASCE Water Resources Planning and Management Division, Denver, Colorado, May 1994.
64. "Feedback Method of Control for Minimizing Freshwater Inflows to Estuaries," 21st Annual Conference of the ASCE Water Resources Planning and Management Division, Denver, Colorado, May 1994.

65. "Why Use Risk and Reliability Analysis?", Universities Council on Water Resources 1994 Annual Meeting, Big Sky, Montana, Aug. 1994.
66. "Soil Aquifer Treatment System Research in the Southwest," Universities Council on Water Resources 1994 Annual Meeting, Big Sky, Montana, Aug. 1994.
67. "Water Resource Systems Analysis," New University of Lisbon, Portugal, April 1995.
68. "Development of Methodology for Optimal Operation of Soil Aquifer Treatment System. ASCE, 22nd Annual Conference of the Water Reservoir Planning and Management Division, Cambridge, Mass. May 1995.
69. "New Methodology for the Optimal Operation of Soil Aquifer Treatment Systems, 7th Biennial Symposium on the Artificial Recharge of Groundwater, May 1995.
70. "Optimal Control Approaches for Sedimentation and Flood Control in Rivers," Seoul National University, Korea, July 1995.
71. "Needed Research for Analysis of Alluvial Fans", UCOWR, Annual Meeting, Portland, Maine, August 1995.
72. "Development of Methodology for the Optimal Operation of Soil Aquifer Treatment System," 2nd International Symposium on Wastewater Reclamation and Reuse, Iraklio, Greece, Oct. 1995.
73. "What's Wrong with the FEMA Alluvial Fan Method," Arizona Flood Plain Management Association Conference, Wickenburg, Arizona, February, 1996.
74. "Uncertainty Analysis of Unsaturated Hydraulic Conductivity", International Association of Hydraulic Research, Seventh Symposium on Stochastic Hydraulics, Mackay, Australia, July 1996.
75. "Stochastic Optimal Control Framework for Operation of SAT Systems Considering Parameter Uncertainty and Spatial Variability of the Unsaturated Hydraulic Conductivity", International Association of Hydraulic Research, Seventh Symposium on Stochastic Hydraulics, Mackay, Australia, July 1996.
76. "Uncertainty and Risk Analysis for FEMA Alluvial Fan Method", International Association of Hydraulic Research, Seventh Symposium on Stochastic Hydraulics, Mackay, Australia, July 1996.

77. Keynote Address, "Review of Reliability Analysis of Water Distribution Systems", International Association of Hydraulic Research, Seventh Symposium on Stochastic Hydraulics, Mackay, Australia, July 1996.
78. "Urban Water Pricing and Drought Management: A Risk Based Approach," International Course on Drought Management Planning in Water Supply Systems, Universidad Internacional Menendez Pelayo, Valencia, Spain, Dec. 1997.
79. "New Methodologies for Optimal Operation of Water Distribution Systems for Water Quality Purposes," Hydrossoft 98 sponsored by Wessex Institute of Technology, held in Villo Como, Italy, September 1998.
80. "Regional Water System Development and Management in the U. S. Southwest," International Conference on Integrated Water Management, Universidad Internacional Menendez Pelayo, Valencia, Spain, November 1998.
81. "Computer Models for Integrated Hydrosystems Management," International Conference on Integrated Water Management, Universidad Internacional Menendez Pelayo, Valencia, Spain, November 1998.
82. Future Trends in the Technical Management of Water Distribution Systems: The Optimal Operation, Conference held at the Universidad Politecnica de Valencia, Spain, June 2001.
83. "Effects of Climate Change on Hydraulic Resources", invited talk and paper for the International Symposium on Challenges of the New Water Policies for the XXI Century at the Universidad Internacional Menendez Pelayo, Valencia, Spain, October 2002.
84. Stormwater Management in Arid and Semi-Arid Regions: Research Needs, Invited talk, UNESCO-IHP meeting in Cairo, Egypt, Nov. 2005.
85. "Water Sustainability: Parallels of Past Civilizations and the Present," presented at the International Water History Association (IWHA) conference held at the UNESCO Headquarters in Paris, France, Dec. 2 – 4, 2005.
86. Water Engineering and Management in Ancient Egypt," Introduccio a La Historia de La Ingenieria Y De La Gestion Del Agua. Objectivos del Curso, Alicante, Spain, May 2006.
87. "Integrated Urban Water Management in Arid and Semi-Arid Regions," UNESCO, Paris, France, June 2006.

88. "A Brief History of Ancient Water Distribution," Keynote address given at the IWA International Symposium on Water and Wastewater Technologies in Ancient Civilizations, Iraklio, Crete, Greece, Oct. 2006.
89. "Water Sustainability of Ancient Civilizations in Mesoamerica and the American Southwest, IWA International Symposium on Water and Wastewater Technologies in Ancient Civilizations, Iraklio, Crete, Greece, Oct. 2006
90. "Integrated Urban Water Management in Arid and Semi-Arid Regions," International Symposium on New Directions in urban Water Management, held September 11-14, 2007, UNESCO Headquarters, Paris France.
91. "Urban Flood Management: A Matter of Water Resources Sustainability," 20<sup>th</sup> International Seminar on Urban Flood Disaster Management Technology, held November 29, 2007, Korea University, Seoul, Korea.
92. "A Brief History of Ancient Urban Water Supply Management: The Ancients have Warned Us, Will We Listen?," Luncheon Talk at the International Symposium of Environmental Hydraulics, December 6, 2007, held at Arizona State University.
93. "Realities of Water Resources Sustainability," Invited Talk, IWA-Croucher Foundation Advanced Study Institute, Sustainability of Water Environment and Water Resources, Hong Kong University of Science and Technology, Hong Kong, June 23-27 June 2008.
94. Invited session leader on Water Resources, Gordon Research Conference, Colby-Sawyer College, New Hampshire, August 2008.
95. Water Resources Sustainability and Traditional Knowledge, Invited talk, IPOGEA, Florence, Italy, June 2009.
96. Keynote address, "Ancient gods and goddesses of water," 3<sup>rd</sup> Annual International Water Association Specialized Conference on Water and Wastewater Technologies in Ancient Civilizations, Istanbul, Turkey, March 22, 2012.
97. A Brief History of Cisterns in Antiquity, 3<sup>rd</sup> Annual International Water Association Specialized Conference on Water and Wastewater Technologies in Ancient Civilizations, Istanbul, Turkey, March 23, 2012.
98. A Brief History of Water Filtration/Sedimentation, 3<sup>rd</sup> Annual International Water Association Specialized Conference on Water and Wastewater Technologies in Ancient Civilizations, Istanbul, Turkey, March 23, 2012.



99. **G.V. Loganathon Distinguished Lecture**, “Realities of Water Resources Sustainability during the Past and the Present: Can Ancient Water Technologies and Traditional Knowledge Along with Modern Technologies Help the Poor in the Future?” April 25, 2014 at Virginia Tech.
100. **ASCE Julian Hinds Award Lecture**, “Water Resources Sustainability, Traditional Knowledge, and the Future of the Poor,” Annual ASCE EWRI meeting, Portland Oregon, June 4, 2014.
101. Keynote address at the 6<sup>th</sup> Internal Conference on Water Resources and Arid Environments (ICWRAE), “Realities of Water Resources Sustainability, Traditional Knowledge, and the Future.” King Saud University , Riyadh, Kingdom of Saudi Arabia, December 17, 2014.
102. Acceptance address of the **2015 Warren Hall Medal** at the awards banquet of the Universities Council on Water Resources held in Henderson, Nevada on June 17, 2015. “Realities of Water Resources Sustainability, Traditional Knowledge and the Future.”
103. Invited talk “Water Resources Sustainability, Traditional Knowledge and the Poor,” at the U.S.G.S. office in Rolla, Missouri for staff and graduate students from the Missouri University of Science and Technology on April 21, 2016.
104. **ASCE Ven Te Chow Award lecture**, “Ancient Storm Water Management,” at the World Environmental and Water Resources Congress, West Palm Beach, Florida, May 25, 2016.
105. Survey of Ancient Water Technologies in Semi-Arid and Arid Regions: Traditional Knowledge for the Future, Proceedings, IWA Conference on Water and Wastewater in Ancient Civilizations, University of Coimbra, Coimbra, Portugal, September 17-19, 2016.
106. Historical Development of Wastewater Management, Invited talk, GWI Session Initiatives: Past, Present and Future, IWA Conference on Water and Wastewater in Ancient Civilizations, University of Coimbra, Coimbra, Portugal, September 18, 2016.
107. Presented a series of invited lectures on stormwater management and floodplain management at ASCE sponsored workshop at ESPOL - Escuela Superior Politecnica del Litoral in Guayaquil, Ecuador. 2017.
108. Lunch keynote at ASCE/ASHE Arizona Conference, “**Ancient Water Technologies: Traditional Knowledge and Sustainability for the Future**,” Phoenix, Arizona, September 15, 2017.

109. Lunch keynote at USCID 11<sup>th</sup> International Conference on Irrigation and Drainage, Water Reuse and Non-Traditional Water Resources for Irrigated Agriculture, Ancient Water Technologies: Traditional Knowledge and Sustainability for the Future,” Mesa, Arizona, October 18, 2018.
110. Keynote address at Seminar on Ancient Water Technologies, held at ancient Stratonakeia, Yatagan, Mugla, Turkey, October 23, 2018.
111. Keynote address at the UKSAY International Symposium on Urban Water and Wastewater Management, Models for Real-time Operation of Urban Water Delivery Systems Considering Resilience under Limited Electrical Energy and Water Availability, Pamukkale/Denzili, Turkey, Oct. 25, 2018.
112. Presented invited keynote address at the United Arab Emirates University (UAEU) Annual Research and Innovation Conference titled “Water Engineering in Arid and Semi-Arid Regions: Ancient to the Present.” Feb 6, 2019.

## **MILITARY SERVICE**

Basic Training, Ft. Leonard Wood, Missouri, August 1970 - October 1970.  
 399th Army Band, Ft. Leonard Wood, Missouri, October 1970 - November 1971.  
 U.S. Army Engineer (WES) Explosive Excavation Research Laboratory (EERL),  
 Lawrence Livermore Laboratory, Livermore, California, November 1971 - June 1973.  
 List of reports he authored from research at EERL.

1. “Row Cratering Design Codes,” *Report* No EERL PR-E-76-7, U. S. Army Engineer Explosive Excavation Research Laboratory, Livermore, California, January 1972.
2. “Computer Codes Used in the Preliminary Assessment of the KRA Canal,” *Report*, U.S. Army Engineer Explosive Excavation Research Laboratory, Livermore, California, 42 pp., April 1973.
3. “Optimization of Cost and Time for Single-Charge Cratering,” Chapter 7 in *Military Engineering Applications of Commercial Explosives: An Introduction, Technical Report E-73-2*, U.S. Army Engineer Waterways Experiment Station, Explosive Excavation Research Laboratory, Livermore, California, pp. 107-121, May 1973.
4. “Explosive Excavation System: Design and Cost Optimization Models,” *Report*, U.S. Army Engineer Explosive Excavation Research Laboratory, Livermore, California, 53 pp., May 1973.

**ADMINISTRATIVE DUTIES** (The University of Texas at Austin)

Director, Center for Research in Water Resources

Area Coordinator, Environmental and Water Resources Engineering

Civil Engineering Advisory Council

Department Committees: Computer Allocations, Long-range Planning, Personnel,  
Curriculum and Courses, Departmental Information and Student Enrollment,  
Library Aquisitions, Graduate Advisor Water Resources Engineering Program  
Supervisor, Water Resources Seminar, Faculty Evaluation and Promotions

College Committees: Mathematics, Library, Scholastic Appeals

University Committees: Graduate Fellowships

## GRADUATE STUDENT SUPERVISION

### Ph.D. Degrees

1. Yeou-Koung Tung, "Optimal Risk Based Design of Hydraulic Structures," Ph.D., August 1980.
2. Gerardo Ocanas, "Optimal Water Reuse Planning, Ph.D., August 1980.
3. Junji Matsumoto, "Capacity Expansion Model for the Planning of Large Scale Water-Energy Systems," Ph.D., December 1981.
4. Cheng-Kang Taur, "Model for Planning Large Water Reuse Systems," Ph.D., December 1984.
5. Nisai Wanakule, "Development of Model for Determining Optimal Pumping and Recharge of Large Aquifer Systems," December 1984.
6. Olcay Unver, "Simulation and Optimization for Real-Time Operations for Multireservoir Systems Under Flooding Conditions," August 1987.
7. Kevin Lansey, "Optimal Design of Large-Scale Water Distribution Systems," August 1987.
8. Ning Duan, "Optimal Reliability-Based Design and Analysis of Pumping Systems for Water Distribution Systems," August 1988.
9. M. John Cullinane, Jr., "Methodologies for the Evaluation of Water Distribution System Reliability/Availability," May 1989.
10. Lehar Brion, "Optimal Operation of Pump Systems," May 1990.
11. Yixing Bao, "Methodology for Determining the Optimal Freshwater Inflows Into Bays and Estuaries," May 1992.
12. Joong-Hoon Kim, "Optimal Rehabilitation/Replacement Model for Water Distribution Systems," December 1992.
13. Carlos Carriaga, "A Model for Determining Optimal Reservoir Releases to Minimize Sedimentation in Alluvial Rivers, December 1993.
14. Bing Zhao, "Stochastic Optimal Control for Determination of Freshwater Inflows to Estuaries", August 1994.
15. Guihua Li, "Differential Dynamic Programming for Estuarine Management," December 1994.

16. Kaan Tuncok, "Feedback Method of Control for Estuarine Management", December 1995.
17. Rick Skaggs, "Enhanced Simulated Annealing Applied to Groundwater Restoration Management", December 1995.
18. Zongwu Tang, "Methodology for Optimal Operation of Soil Aquifer Treatment System", December 1995.
19. Liang Xu, "Optimal Operations of Soil Aquifer Treatment Systems Under Uncertainty", Dec. 1995.
20. Hasan Mushtaq, "A New Methodology for Optimal Operation of Soil Aquifer Systems," Dec. 1997.
21. Aihua Tang, "Genetic Algorithms for Optimal Operation of Soil Aquifer Treatment Systems," Dec. 1997.
22. John Nicklow, "Operation of Multiple Reservoir Systems to Control Sedimentation in Alluvial Rivers," May 1998.
23. Burca Sarkya, "Optimal Operation of Water Distribution Systems for Water Quality Purposes," Mays 1998.
24. Fred Goldman, "The Application of Simulated Annealing for Optimal Operation of Water Distribution Systems," May 1998.
25. Messele Ejeta, "Optimal Integrated Water Resources Planning in Watersheds with Limited Water Resources," May 2000.
26. Brian Whalin, "Remote Downstream Feedback Control of Branching Canal Networks," 2002.
27. Sukru Ozger, "A Semi-Pressure-Driven Approach to Reliability Assessment of Water Distribution Networks," 2003.
28. Mohamed Said El Ahmed, "Real-time Optimal Operation of Reservoir-River Systems Under Flooding Conditions," May 2006.
29. Mike Naber, "Optimization of Soil Vapor Extraction Using Simulated Annealing and Genetic Algorithms," May 2007.
30. Dan Rothman, "Evaluation of Water Resources Sustainability Using a Multi-objective Genetic Algorithm," May 2007.

31. Quentin B. Travis, “Ebb and Flow: Preserving Regulated Rivers by Optimizing Upstream Dam Operations,” December 2010.
32. Nazli Aydin, “Scenario-Based Sustainability Assessment to Provide Interactive Decision Support for the Long-Term Transition of Urban Water Supply Systems,” University of Kaiserslautern, Germany, served as co-advisor, November 2014.
33. Oxley, Robert, “Ecological, Environmental and Hydrological Integrity in Sustainable Water Resource Management for River Basins,” May 2015.
34. Che, Daniel, “Optimization/Simulation Model for Determining Real-Time Optimal Operation of River-Reservoir Systems During Flooding Conditions,” August 2015.
35. Aljabani, Ahmed, Optimization Models for Iraq’s Water Allocation System, Co-Chair with P. Fox, May 2019.

Graduate student Ph.D. dissertations to be completed in Spring/Summer 2019

#36 Puneet Khatavkar – Real-time Operation of Water Supply Systems During Limited Power and/or Water Availability, May 2019

#37 Hasan Albo-Salih, Real-time Operation of Reservoirs During Flood Conditions using Optimization/Simulation with One and Two-Dimensional Modeling, Mays 2019

#38 Faisal Mohammed Alfaisal, Optimization Models for Regional Wastewater Systems; Jizan Region, Saudi Arabia, August 2019

M.S. Degrees with Thesis

1. Yeou-Koung Tung, “State Variable Modeling Applied to Urban Water Resource Systems Analysis,” M.S., May 1978.
2. Hund-Der Yeh, “Models for Assessing Large-Scale Storm Sewer Systems,” M.S. May 1978.
3. Hui-Fong Chang, “State Variable Kinematic Wave Model for Stream Flow Routing,” M.S., May 1980.
4. Upmanu Lall, “An Optimization Model for Planning Water and Energy Systems,” M.S. May 1980.

5. James Machin, "Environmental Inventory and Impact Analysis: Sparta Mine-Surface Water Hydrology," M.S. Report, May 1980.
6. Robert Randolph, "Optimal Management of Aquifers Under Artesian Conditions," M. S., December 1980.
7. Mary Schwartz, "Dynamic Programming Models for Wastewater Treatment Planning and Reuse Allocation," M.S., December 1981.
8. Morey Walker, "Hydraulic Performance of Box Culverts with Safety Grates," M.S., May 1982.
9. Michael Bennett, "Dynamic Programming Model for Determining Optimal Sizes and Locations of Detention Storage Facilities," M.S., May 1982.
10. Monica Perez-Valcarcel, "Water Energy System Planning in Colombia," M.S., December 1982.
11. Han-Lin Lee, "Advances in Risk and Reliability Analysis for Hydraulic Structures," M.S., May 1983.
12. John Rutledge, "Calibration of Unsteady Flow Routing Models," M.S., May 1985.
13. David Wheelock, "Application of A Finite Element Surface Water Model," M.S., June 1986.
14. Yu-Chun Su, "Reliability-Based Optimization Model of Water Distribution Systems," M.S., December 1986.
15. Lehar Brion, "Two-Dimensional Flow Analysis at Bridge Using the Finite Element Method on a Microcomputer," August 1986.
16. John Woodburn, "A Methodology for the Rehabilitation of Water Distribution Systems Using Nonlinear Programming," August 1987.
17. Mao-Chang Shih, "Water Distribution System Risk Parameter Evaluation Using Computer Program RPE," August 1989.
18. Hasan Mushtaq, "Hydraulic Modeling of Alluvial Fans Using DAMBRK," December 1990.
19. Wendy Wonderly, "Optimization Models for the City of Phoenix's Water Production and Distribution System, Present and Future," December, 1991.

20. Ning Mao, "Goal Programming Models for Determining Freshwater Inflows to Bays and Estuaries," December 1992.
21. Wenchin Shi, "Multi-objective Optimization of Freshwater Inflows Into Estuaries Using the Surrogate Worth Tradeoff Method," December 1992.
22. James L. Condit, "Batam Island, Indonesia Point Source Wastewater Management Master Plan Collection and Treatment Alternatives," December 1992.
23. Lise LeBlanc, "Epsilon-Constraint Models for Determining Freshwater Inflows Into Bays and Estuaries," May 1993.
24. Jim Siebert, "Multi-objective Optimization Involving Freshwater Inflows Into Bays and Estuaries Using Utility Function Assessments", August 1993.
25. Brian Whalin, Discharge Characteristics of an Overshot Gate, December 1994.
26. John Svehovsky, Dynamic Programming Optimization Model of Detention Basin Networks for Small Watershed Project Planning in Maricopa County, Arizona, December, 1996.
27. Messele Ejeta, "Urban Water Pricing and Drought Management: A Risk-based Approach," May 1998.
28. Peter Newell, Simulation of Verde River Under a Demand Priority Ranking System, December 2007.
29. Robert Oxley, A Simulated Annealing Application for the Optimal Design of a Detention Basin System, December 2007.
30. Alejandro Riano, The Shift of Precipitation Maxima on the Annual Maximum Series using Regional Climate Model Precipitation Data, 2013.
31. Puneet N. Khatavkar, Optimization Model for Design of Vegetative Filter Strips for Stormwater Management and Sediment Control, December 2015.
32. Mason Lacy, Optimization Model for the Design of Bioretention Basins with Dry Wells, May 2016.
33. Rutuja Sutar, May 2019



## PUBLICATIONS

### Solutions Manuals for Books

Solutions Manual for Applied Hydrology, by V. T. Chow, D. R. Maidment and L. W. Mays, McGraw-Hill Book Co., 1988.

Solutions Manual for Hydrosystems Engineering and Management, by Larry W. Mays and Y. K. Tung, McGraw-Hill Book Co., 1992.

Solutions Manual for Water Resources Engineering, by Messele Ejeta and Larry W. Mays, John Wiley and Sons, Inc., 2002.

Solutions Manual for Groundwater Hydrology, by Sukru Ozger and Larry W. Mays, John Wiley and Sons, Inc., 2004.

Solutions Manual for Ground and Surface Water Hydrology, John Wiley and Sons, Inc. 2011

Solutions Manual for 3<sup>rd</sup> edition of Water Resources Engineering, Larry W. Mays, John Wiley and Sons, Inc., 2019.

### Book Chapters (in other books)

(with Y. K. Tung), “Optimal Design of Stilling Basins of Overflow Spillways,” Chapter 19, Civil Engineering Practice 2 Hydraulics/Mechanics, Technomic Publishing Co., Inc., Lancaster, Pennsylvania, 1988.

(with Y. K. Tung), “Optimal Risk-Based Hydraulic Design of Highway Bridges, Chapter 18, Civil Engineering Practice 2 Hydraulics/Mechanics, Technomic Publishing Co., Inc. Lancaster, Pennsylvania, 1988.

Sakarya, A. B., F. E. Goldman, and L. W. Mays, Models for the Optimal Scheduling of Pumps to Meet Water Quality, Water Industry Systems: Modeling and Optimization Applications - Volume II, edited by Dragan Savic, Research Studies Press, Ltd, Baldock, Hertfordshire, England, pp. 379-391, 1999.

General characteristics of arid and semi-arid regions, Volume III, Urban Drainage in Specific Climates, Technical Documents in Hydrology, No. 4 (chief editor, Cedo Maksimovic and volume edited by M. Nouh), UNESCO, International Hydrological Programme, Paris 2001

Hermes, V. A. and L. W. Mays, Regional water system development and management in the U. S. Southwest, Regional Water System Management: Water Conservation, Water Supply, and System Integration, (edited by E. Cabrera, R.

Cobacho, and J. R. Lund), A. A. Balkema Publishers, Lisse, The Netherlands, 2002.

Ejeta, M. Z. and L. W. Mays, Computer Models for integrated hydrosystems management, Regional Water System Management: Water Conservation, Water Supply, and System Integration, (edited by E. Cabrera, R. Cobacho, and J. R. Lund), A. A. Balkema Publishers, Lisse, The Netherlands, 2002.

World Book Encyclopedia, several parts on water and dams.

“Open Channel Flow,” in Introduction to Fluid Mechanics, 7<sup>th</sup> Edition, by Fox, R.W., A.T. McDonald, and P.J. Pritchard, John Wiley & Sons, Inc. New York, 2008.

“Water Engineering and Management in Ancient Egypt,” Water Engineering and Management Through Time: Learning From History, edited by E. Cabrera, CRC Press, Taylor and Francis Group, London, 2010.

De Feo G, Mays LW and Angelakis AN (2011) Water and Wastewater Management Technologies in the Ancient Greek and Roman Civilizations. In: Peter Wilderer (ed.) Treatise on Water Science, vol. 4, pp. 3–22 Oxford: Academic Press.

De Feo, G.; Antoniou, G.P.; Mays, L.; Dragoni, W.; Fardin, H.F.; El-Gohary, F.; Laureano, P.; Kanetaki, E.I.; Zheng, X.Y.; Angelakis, A.N. Historical Development of Waste Water Management. In Handbook of Engineering Hydrology, 1st ed.; Eslamian, S., Ed.; Taylor and Francis: Boca Raton, USA, 2014; Volume 2.

Haut, B., X.Y. Zheng, L. Mays, M. Han, C. Passchief, and A.N. Angelakis, Evolution of Rainwater Harvesting in Urban Areas through the Millennia: A Sustainable Technology for Increasing Water Availability. In Water & Heritage: Material, Conceptual and Spiritual Connections, Edited by Willem J.H. Willems and Henk P.J. van Schaik, Leiden: Sandstone Press, 2015.

Tung, Y.K. and L.W. Mays, Risk-Reliability Analysis, Chapter 27, Handbook of Applied Hydrology: Second Edition, V. Singh (editor), pp. 27.1-27.10, 2016.

Charlesworth, S.M., L. A. Sañudo-Fontaneda, L. W. Mays (2017) *Back to the Future? History and Contemporary Application of Sustainable Drainage Techniques*. Chapter 2. In: Charlesworth S.M. and Booth, C. (eds) Sustainable Surface Water Management; A Handbook for SuDS. Wiley Blackwell publishing. DOI: 10.1002/9781118897690.ch2, pp. 11-30.



## REFEREED JOURNAL PUBLICATIONS

1. (with B. C. Yen and W. H. Tang) “Designing Storm Sewers Using the Rational Method,” *Water and Sewage Works*, Part I, October 1974.
2. (with B. C. Yen and W. H. Tang) “Designing Storm Sewers Using the Rational Method,” *Water and Sewage Works*, Part II, November 1974, pp. 84-85.
3. (with B. C. Yen) “Optimal Cost Design of Branched Sewer Systems,” *Water Resources Research*, Vol. 11, No. 1, pp. 37-47, February 1975.
4. (with W. H. Tang and B. C. Yen) “Optimal Risk-Based Design of Storm Sewer Networks,” *Journal of Environmental Engineering Division*, ASCE, Vol. 101, No. EE3, pp. 381-398, June 1975.
5. (with H. G. Wenzel) “Optimal Design of Multilevel Branching Sewer Systems,” *Water Resources Research*, AGU, Vol. 12, No. 5, pp. 913-917, October 1976.
6. (with H. G. Wenzel and J. C. Liebman) “Model for Layout and Design of Sewer Systems,” *Journal of the Water Resources Planning and Management Division*, ASCE, Vol. 102, No. WR2, pp. 385-405, November 1976.
7. (with W. H. Tang and H. C. Wenzel) “Discounted Flood Risks in Least-Cost Design of Storm Sewer Networks,” pp. 293-318, in *Stochastic Processes in Water Resources Engineering*, Book edited by L. Gottschalk, G. Lindh, and L. de Mare, Water Resources Publications, Fort Collins, Colorado, 1977.
8. (with Y. K. Tung) “State Variable Model for Sewer Network Flow Routing,” *Journal of the Environmental Engineering Division*, ASCE, Vol. 104, No. 1, pp. 15 -30, February 1978.
9. “Sewer Network Scheme for Digital Computation,” *Journal of the Environmental Engineering Division*, ASCE, Vol. 104, No. EE3, pp. 535-539, June 1978.
10. (with L. Lum) “Optimizing Cooling Policy for a System of Power Plants,” *Journal of the Energy Division*, ASCE, Vol. 105, No. EY1, pp. 137-155, January 1979.

11. (with J. Matsumoto) "Computerized Pump Analysis for Water Systems," *Journal of the Environmental Engineering Division*, ASCE, Vol. 105 No. EE1, pp. 155-160, February 1979.
12. "Optimal Design of Culverts under Uncertainties," *Journal of the Hydraulics Division*, ASCE, Vol. 105, HY5, pp. 443-460, May 1979.
13. (with L. Coles) "Optimization of Unit Hydrograph Determination," *Journal of the Hydraulics Division*, ASCE, Vol. 106, No. HY1, pp. 85-97, January 1980.
14. (with Y. K. Tung) "Risk Analysis for Hydraulic Design," *Journal of Hydraulics Division*, ASCE, Vol. 106, No. HY5, pp 893-913, May 1980.
15. (with G. Ocanas) "A Model for Water Reuse Planning," *Water Resources Research*, AGU, Vol. 17, No 1, pp. 25-32, February 1981.
16. (with Y. K. Tung) "Reducing Hydrologic Parameter Uncertainty," *Journal of the Water Resources Planning and Management Division*, ASCE, Vol. 107, No. WR1, pp. 245-262, March 1981.
17. (with Y. K. Tung) "Generalized Skew Coefficients for Flood Frequency Analysis," *Water Resources Bulletin*, AWRA, Vol. 17, No. 2, pp. 262-269, April 1981.
18. (with Y. K. Tung) "State Variable Model for Urban Rainfall-Runoff Process," *Water Resources Bulletin*, AWRA, Vol. 17, No. 2, pp. 181-189, April 1981.
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25. (with L. Brion), "Two-Dimensional Analysis of Backwater at Bridges," Research Report 466-1F," Center for Transportation Research, The University of Texas at Austin, November 1987.
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30. (with Y. Bao, G. Li, B. Zhao) "Methodologies for Determining the Optimal Freshwater Inflows Into Bays and Estuaries," Final Report to National Science Foundation for Grant No. BCS-9014406, February 1994.

## CONSULTING

- U.S. Army Construction Engineering Research Laboratory, Champaign, Illinois.  
  
Developed computer models for analyzing storm and sanitary sewer systems on military installations.  
Developed computer model for pump analysis for sanitary sewer systems.
- Various groups for urban hydraulic design and flood analysis.
- Environmental Science and Engineering Program, Rice University for development of a computer code based upon dynamic programming for detention basin design.
- Have given expert testimony in several public hearings and trials.
- United Nations UNDP for lectures and consulting in India
- Reich and Binstock, Houston, Tx.
- Brazoria County, Texas. Flood plain studies.
- Texas Department of Highways, Attorney General's Office, State of Texas.
- City of Austin, Texas. Developed computer code for detention basin design.
- City of Round Rock, Texas. Flood plain studies on Brushy Creek watershed.
- U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, Mississippi. A review and evaluation of reliability concepts for design and evaluation of water distribution systems.
- Various lawsuits for Summey Building Systems; City of Austin, Texas; City of Round Rock, Texas.
- City of Austin. Design and Analysis of Waller Creek Flood By-pass Tunnel.
- Camp, Dresser, and McKee, Inc. Development of computer-based system for analysis of water distribution systems.
- Union Pacific Railroad providing testimony for litigation.
- Attorney General's Office, The State of Texas.
- Texas Low-level Radioactive Waste Disposal Authority.

- James M. Montgomery, Inc.
- Dames and Moore, Inc.
- Lower Colorado River Authority
- UDC Homes.
- McDonnell-Douglas, Burr-Brown, Tucson Airport Authority, General Dynamics
- Boeing Corporation
- Metropolitan Water District of Southern California
- Various law firms in Texas, Illinois, California, Wisconsin, Tennessee, and Arizona
- Ontario Hydro, Toronto, Canada
- Collins Law Firm, Naperville, Illinois
- United Nations UNESCO-IHP, Paris France (Integrated Urban Water Management in Arid and Semi-arid Regions)
- Travelers Insurance, and other insurance companies on subrogation matters.
- American Water Works Association, developed 4<sup>th</sup> edition of Water Transmission and Distribution
- Presented a series of lectures in June 2017 on stormwater management and floodplain management at ASCE sponsored workshop at ESPOL - Escuela Superior Politecnica del Litoral in Guayaquil, Ecuador.
- Consultant on watershed modeling project of the Northwest Watershed (Guayaquil, Ecuador) with the international consortium Interagua/Greeley and Hansen, June 2017.

## **Example Consulting Reports**

Flood Plain Hydrology Study of Upper Brushy Creek Watershed, City of Round Rock, Texas, September 1984.

Report to the United Nations on the Consultancy Assignment in Water Resources Systems Analysis, Central Water and Power Research Station, Pune, India, June 1985.

Preliminary Study and Conceptual Design of a Flood Bypass Tunnel for Waller Creek, City of Austin, Texas, February 1987.

Hydrologic and Hydraulic Analysis of the John Nieman Tract and Surrounding Properties, prepared for Attorney General's Office, State of Texas, Austin, Texas, August 1989.

Inks Lake Flood Plain Study, Lower Colorado River Authority, Austin, Texas, June 1995. (with Carlos Carriaga)

Evaluation of the 1996 von Lindern Report, "Assessment of Exposures to Solvents in the Drinking Water Supply of Twenty Individuals Living in the Southside/Airport Area of Tucson, Arizona, 1950-1980,"

Preliminary Assessment of Causes for Flooding: Clear Creek and Mary's Creek Watersheds, Pearland, Texas, September 25, 1997.

Report on Flooding in White Oak Bayou During the September 10-11, 1998 Tropical Storm Frances, Cause No. 1999-45553; Edward A. and Norma Kerr, et al. V. Harris County Flood Control District, et al.; 133<sup>rd</sup> Judicial District Court Harris County, Texas, Jan. 2001.

Hydrologic Study of Five Washes in the Picacho Plain, Quechan Indian Tribe, Fort Yuma Case, Metropolitan Water District of Southern California, Los Angeles, 2002.

Preliminary Assessment of the Rainfall and Flooding on Lower Brays Bayou as a Result of Tropical Storm Allison (June 2001), December 1, 2003.

Preliminary Engineering Assessment of Strawberry Water Company System, prepared for Lewin & Schneider, Phoenix, Arizona, April 27, 2004

Preliminary Assessment: Cause of Flooding in the Texas Woman's University during Tropical Storm Allison (June 8-9, 2001), Cause No. 2003-31948; Texas Woman's University V. The Methodist Hospital, The Methodist Hospital Foundation, and The Methodist Health Care System, 151<sup>st</sup> Judicial District Court of Harris County, Texas, October 4, 2004.



Analysis of Increased Flooding along the Gila River Caused by the 1993 Breach of the Gillespie Dam and the FCD Upstream Clearing Project, prepared for Kinerk, Beal, Schmidt, Dyer, and Sethi, P.C., Tucson, Arizona, November 2004.

Preliminary Assessment: Cause of Flooding in the Memorial Hermann Hospital during Tropical Storm Allison, June 8-9, 2001, February 18, 2005.

Supplemental Report, Report on Flooding in White Oak Bayou During the September 10-11, 1998 Tropical Storm Frances, Cause No. 1999-45553; Edward A. and Norma Kerr, et al. V. Harris County Flood Control District; 133<sup>rd</sup> Judicial District Court Harris County, Texas May 22, 2007.

Report on Causes of Flooding of Gottlieb Memorial Hospital (GMH) (2014), Cause No. 12-cv-00717, Travelers Property Casualty Company of America, as Subrogee of Gottlieb Health Resources, Inc. and Gottlieb Memorial Hospital.

Certificate of Merit, Concerning the flooding of Riverstone Development, Fort Bend County, Texas during Hurricane Harvey, April 2018.

City of San Juan, Texas Water Distribution System: An Analysis of Operations Problems, July 24, 2018.

### **Books by Former Ph.D. Students of Larry W. Mays**

**Dr. Y. K. Tung (Professor, Hong Kong University of Science and Technology, retired)**

Hydrosystems Engineering Uncertainty Analysis, (Co-authored with Ben C. Yen), McGraw-Hill, New York, 2005.

Hydrosystems Engineering Reliability Assessment and Risk Analysis, (Co-authored with Ben C. Yen and Charles Melching), McGraw-Hill, New York, 2005.

Reliability and Uncertainty Analysis in Hydraulic Design, (Edited by Ben C. Yen and Y. K. Tung), ASCE, New York, 1993.

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**Dr. Kevin Lansey (Professor and former Head of Civil Engineering, University of Arizona)**

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