

Extending the Water Demand Calculator to Commercial & Institutional Buildings

The plumbing industry was recently introduced to IAPMO's Water Demand Calculator (WDC) for estimating peak indoor demand in residential buildings fitted with water-conserving fixtures. The WDC is the first significant codified modification to Hunter's curve in 80 years. The WDC has been shown, both in the U.S. and Australia, to mitigate the problem of oversizing residential plumbing systems when compared to Hunter's method. This session will outline the next steps in the evolution of the WDC to estimate peak water demands. The panel will review Hunter's Curve, demonstrate the benefits of using the WDC probability methods to update Hunter's curve using real examples of projects, identify the challenges (and opportunities) to applying the WDC to commercial and institutional buildings, identify the types of buildings that are classified as commercial and institutional buildings, and discuss the scope of work necessary to implement a national survey of peak water use in commercial and institutional buildings. In addition, knowing that reduced demand requires reduced pipe sizes, the panel will explore the effect of pipe sizes on the relationship between reduced flow and pressure loss in indoor plumbing systems.



**Steven Buchberger, PhD,
PE**

Steven G. Buchberger is a professor of Civil and Environmental Engineering at the University of Cincinnati. His research deals with urban water resources and hydrology, with recent emphasis on estimating peak water demands in buildings including development of IAPMO's Water Demand Calculator. Since joining the UC faculty in 1988, Steve has advised 65 graduate students, authored more than 130 archived publications, and directed \$11 million in research projects. He is a founding member of the ASCE Premise Plumbing Modeling Task Group. Three of his students have won national best paper awards from the American Society of Civil Engineers. Steve earned his PhD in Civil Engineering at the University of Texas at Austin and is a Registered Professional Engineer in the State of Colorado.



**Natascha Milesi Ferretti,
MSc, PE**

Natascha Milesi Ferretti is a Mechanical Engineer at the U.S. National Institute of Standards and Technology. Natascha was actively involved in the NIST Appliance Program—a congressionally mandated program to develop testing and rating procedures for residential appliances conducted for the U.S. Department of Energy. She has extensive experience conducting laboratory tests and works with both national and international stakeholders and standards-making organizations. Her current research is in two areas: 1) on building commissioning for improved energy performance and 2) establishing the measurement science to better understand the pressure vs. flow relationships for premise plumbing in buildings.



Toritseju Omaghomi

Toritseju Omaghomi graduated from the Environmental Engineering program at the University of Cincinnati where she developed IAPMO's Water Demand Calculator as part of her Doctoral Dissertation. Her research interest includes water conservation, modeling, and integrated engineering of water resources at a regional and household scale. Her current research involves predicting peak water demand in buildings to rightly size indoor plumbing systems.



Gary Klein

Gary Klein, President of Gary Klein & Associates Inc., has been intimately involved in energy efficiency and renewable energy since 1974. Gary has a passion for hot water: getting into it, getting out of it, and efficiently delivering it to meet customer's needs. He is also an advocate of right-sizing plumbing systems. After serving 19 years with the California Energy Commission, he has provided consulting on sustainability since 2008, with an emphasis on the water-energy-carbon connection. Gary received a B.A. from Cornell University in 1975 with an Independent Major in Technology and Society with an emphasis on energy conservation and renewable energy. IAPMO recognized his efforts in 2014 by presenting him with their Green Professional of the Year award. In 2015 the Department of Energy awarded him the Jeffrey A. Johnson Award for Excellence in the Advancement of Building Energy Codes.