

Tirusew Asefa, Ph.D., P.E., D.WRE

Planning & Decision Support Manager, Tampa Bay Water, 2575 Enterprise Rd, Clearwater FL 33763
Courtesy Professor, University of Florida, 4204 E. Fowler Ave., Tampa FL 33620
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Summary

Dr. Asefa has a broad interest in water resources management, climate dynamics, risk management sustainability, and decision making under uncertainty. He is motivated by the challenges of solving real-life problems making a difference in the community. Some of the innovative tools that his team developed have been featured by Whitehouse initiative's *Climate Resiliency Toolkit* (<https://toolkit.climate.gov/>).

Research and Professional Interest

- Climate variability & Climate changes
- Integrated Hydrologic Modeling
- Planning under deep uncertainty, and developing systems level decision support tools
- Statistical learning tools/intelligent algorithms
- Risk and reliability

Professional Training

- Ph.D., Civil and Environmental Engineering, Utah State University, Logan, Utah, U.S.A. 2004. Suma Cum Laude
Dissertation: Statistical Learning Theory: Concepts and applications in water resources Management. *Advisor:* Dr. M. Kemblowski
- M.Sc., Hydrology, Free University of Brussels Brussels, Belgium, 1998. Magna Cum Laude.
Thesis: Open integration of a hydrological model and GIS to study the response of a catchment
Advisor: Dr. F. De Smedts
- B.Sc., Irrigation Engineering, Arbaminch University Arbaminch, Ethiopia, 1993. Great Distinction.

Industry Experience

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| • Manager, Planning & Systems Decision Support | Tampa Bay Water | 2016 – Present |
| • Manager, Systems Decision Support | Tampa Bay Water | 2014 – 2016 |
| • Principal Water Resources Engineer | Tampa Bay Water | 2012- 2014 |
| • Senior Water Resources Engineer | Tampa Bay Water | 2008 – 2012 |
| • Water Resources Engineer | Tampa Bay Water | 2004 – 2008 |
| • Research Engineer | Free University Brussels, Belgium | 1998 - 2008 |

Academic Experience

- Courtesy Professor, University of South Florida
Courses: 2016 – Present
- Lecturer, Arbaminch University, Arbaminch, Ethiopia
Courses: Engineering mechanics, Pumps 1993-1996
- Current M.Sc. Students from Pan African University in Water and Energy Science (Expected September 2017)

- Jemal Mohammed Hassen, Assessment of Land Use Impacts on Surface Runoff and Its Implication for Long-term Planning, Using SWAT Model at Baro River Basin, Southwestern Ethiopia
- Endalkachew Yeshewas MUCHE, Assessment of climate change impact on hydrology of lower Awash Sub Basin, Ethiopia..
- Jean Marie Pascal KWISANGA, Understanding flood risk and developing a framework for a mitigation strategy under current and future climate scenarios: A case study for Nyabarongo Upper Catchment, Rwanda

Synergic Activities

- Member of Tampa Bay Climate Science Advisory Panel
- Member of Water Utilities Climate Alliance (WUCA) (<http://www.wucaonline.org/html/>)
- Project Advisor for several Water Research Foundation projects
 - WRF-4615: Framework for Evaluating Alternative Water Supplies: Balancing Cost with Reliability, Resilience, and Sustainability.
 - WRF-4636: Climate Change impact on Water Resources Management, funded by EPA), and WRF-4667 (Long-term Demand forecast)
- Co-Chair, Florida Water and Climate Alliance (<http://floridawca.org/>)
- EPA-Invited expert on risk and resilience of water and waste water utilities working group: <https://www.epa.gov/crwu>
- CNW-Charting New Water invited expert for a panel on “Ensuring adequate water in a drier world” by the Johnson foundation and ReNUWit (re-inventing the nation’s urban water infrastructure, a National Science Foundation (NSF) project)-brought together the nations leading experts in the field (<http://www.johnsonfdn.org/aboutus/chartingnewwaters>)
- American Metropolitan Water Association (AMWA)-sustainability committee member.
- Invited to contribute in United Nation’s Global Sustainable Development Report (GSDR)-2016 (<https://sustainabledevelopment.un.org/globalsreport/2016>)
- NASA Post-doctoral program reviewer

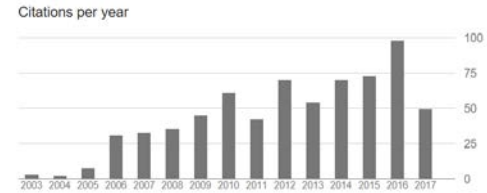
In the News

- 83 Degree Media, 2016, Rethinking Tampa Bay’s water resources as climate change, *featured article*, April 19, 2016, <http://www.83degreesmedia.com/features/climatechange041916.aspx>
- NOAA, 2012, Florida’s Fragile Oasis by Brian Khan, Climate Watch Magazine, September 13, 2012. <http://www.climatewatch.noaa.gov/article/2012/floridas-fragile-oasis>.
- **Whitehouse Initiative climate residence toolkit:** documents Tampa Bay Water’s effort in climate variability and water resources management applied research. <https://toolkit.climate.gov/content/worried-about-water-tracking-climate-assures-supply-climategov-518>

Publications (last 5 years)

Research Gate: https://www.researchgate.net/profile/Tirusew_Asefa

Google Scholar: <https://scholar.google.com/citations?user=K4YmxzkAAAAJ&hl=en>



- **Asefa T**, 2017. Climate Action Plan Manual: American Water Works Association Manual M71. Chapter 4 and Chapter 6, *in press*.
- Panaou, T., **Asefa, T.** and M. Nachabe, 2017. Keeping Them Honest: Examining climate states and transition probabilities of precipitation projections in General Circulation Models, Journal of Water Resources Planning and Management, *accepted pending revision*.
- Wang, H. and **T. Asefa**, 2017, Impact of Different Types of ENSO Conditions on Seasonal Precipitation and Streamflow in the Southeastern United States, International Journal of Climatology, *In Press*.
- Di, T., Martinez, C. and **Asefa T**, 2016, Improving short-term urban water demand with reforecast analog, Journal of Water Resources Planning and Management.
- Fullerton, T., **Asefa T.** and Walke, A., 2016, Short-run water demand forecast accuracy for the Tampa Bay area, Journal of American Water Works Association.
- **Asefa T**, 2015. Innovative systems-based decision support: A tale for the real world, Journal of Water Resources Planning and Management. Invited editorial commentary, 141(9), 01815001
- **Asefa, T.**, A. Adams, and N. Wanakule, 2015, A level of service concept for planning future water supply projects under probabilistic demand and supply framework, Journal of American Water Resources Association, 51(5) pp: 1272-285, DOI: 10.1111/1752-1688.12309.
- **Asefa, T.**, A. Adams, and I. Kajtezovic-Blankenship, 2014, A tale of integrated regional water supply planning: Meshing socio-economic, policy, governance, and sustainability desires together, Journal of Hydrology, [doi:10.1016/j.jhydrol.2014.05.047](https://doi.org/10.1016/j.jhydrol.2014.05.047), vol. 519, Part C, pp. 2632-2641
- **Asefa, T.**, J. Clayton, A. Adams, 2014, Performance Evaluation of Water Supply Utilities under Varying Climatic Condition: Reliability, Resilience, Vulnerability, and Beyond, Journal of Hydrology, *Cited the most downloaded article in the past 90 days-Journal of Hydrology January through-April 2014*.
- **Asefa, T.**, N. Wanakule, A. Adams, J. Shelby and J. Clayton 2014, On the Use of system Performance Metrics for Assessing Incremental Water-use Permit, Journal of Water Resources Planning & Management, *in press*.
- **Asefa, T.** and A. Adams, 2013, Reducing bias corrected precipitation projections uncertainties: A Bayesian based indicator weighting approach, Journal of Regional Environmental Change 13:111-120 DOI 10.1007/s10113-013-0431-9
- Syewoon, H., C. Martinez and **Asefa, T.** 2012, Assessing the benefits of incorporating rainfall forecasts into monthly flow forecast system of Tampa Bay Water, Florida, Journal of the Korean society of Agricultural Engineers 54(4), pp. 127 - 135.
- Syewoon, H., **Asefa, T.**, and Seungwoo, C. 2013, Assessing the utility of rainfall forecast for weekly groundwater level forecast in Tampa Bay Region, Florida, Journal of the Korean society of Agricultural Engineers 55(6), pp. 1 - 9.

Honors and Awards

- Distinguished Speaker, 2015, Cornell University College of Engineering, (October 29th – November 1st) provided seminar and share experience with faculty, researchers, and students.
- Diplomate in Water Resources Engineering, American Academy of Water Resources (AAWRE), 2014
- Future of the Region Award. Member of the Award winning Climate Science Advisory Panel who recommended sea level rise projections for planning in Tampa Bay area.
http://www.tbrpc.org/events/for/2016/pdf/2016_FOR_Winners.pdf
- February 2006. Received editor-in-Chief's appreciation letter and a souvenir for outstanding reviewing, *Journal of Ground Water*.
- December 2004. Summa Cum Laude. Ph.D. Civil and Environmental Engineering, Utah State University.
- May 2003. Outstanding Student Paper Award. First place. American Water Resources Association Utah Section. (Prize: \$400 and invited speaker on 31st AWRA section conference). Paper Title: *Multi-time Scale Stream Flow Prediction: The Support Vector Machines Approach*.
- July 1998. Great Distinction (M.Sc.), First Place, Department of Hydrology, Free University Brussels, Belgium.
- July 1997. Magna Cum Laude (Graduate Diploma), tied First place, Complementary Studies in Water Resources Engineering, Catholic University Leuven, Belgium.
- 1996- 1998, Belgian Government Scholarship.
- 1993 Great distinction and First place, graduated with department record GPA at the time, Irrigation Engineering, Arbaminch University, Ethiopia

Current Research Project (Co-PI)

Water Integrated Supply Evaluation and Sourcing Tool (WISEST) for Water Supply Planning in the Face of Variable and Extreme Precipitation Events (NOAA SAARP. Pending). 175K. Pending.

Additional Publication and Conference Presentations

Refereed Book Chapter

- Batelaan, O., **Asefa, T.**, van Rossum, P., De Smedt, F., 2003, Groundwater Flow Modeling of Three Wetland Ecosystems in River Valleys of Flanders, Belgium. In: Verhoest, N.E.C., Hudson, J. and De Troch, F.P. (eds), *UNESCO IHP-VI Technical Documents in Hydrology*, no. 66.

Peer-reviewed Article

- **Asefa T.** 2009, Ensemble stream flow forecast: A GLUE-Based Neural Network Approach, *Journal of American Water Resources Association (JAWRA)* 45(5) j.1155-1163.
(Selected as Journal cover page and highlight of the October 2009 issue)
- **Asefa T.**, Wanakule N. and A. Adams, 2007, Field-scale applicability of three types of Artificial Neural Networks to predict groundwater levels, *Journal of American Water Resources Association (JAWRA)* 43(5):1-12. DOI: 10.1111 / j.1752-1688.2007.00107.
(Selected as Journal cover page highlight of the October 2007 issue)
- Gill K., **Asefa, T.** and M. McKee, 2007, Effect of missing data on performances of Learning Algorithms: Implications to Imputation Techniques, 43, W07416, doi:10.1029/2006WR005298, *Water Resources Research*.
- **Asefa, T.**, Kemblowski, W.M., McKee, M. and A., Khalil, 2006, Multi-time Scale Stream Flow Prediction: The Support Vector Machines Approach, *Journal of Hydrology*. (318), 7-16.

- Gill K., **T. Asefa**, Kemblowski, W.M. and M. McKee, 2006, Soil moisture prediction using Support Vector Machines, Journal of American Water resources Association, 42(4), 1033-1046.
- Khalil A., M. McKee, M. Kemblowski, **Asefa T.**, and L. Bastidas, 2006, Multi-objective analysis of chaotic dynamic systems with sparse learning machines, 29, 72-88, Advances in Water Resources.
- **Asefa, T.**, M. Kemblowski, U. Lall, and G. Urroz, 2005, Support vector machines for nonlinear state space reconstruction: Application to the Great Salt Lake time series, Water Resources Research, 41, W12422, doi:10.1029/2004WR003785
- **Asefa T.**, Kemblowski M., G. Urroz and M. McKee, 2005, Support Vector Machines for ground water quality monitoring network design, 43(3), pp.423-422, Ground Water.
- Khalil A., M McKee, MW Kemblowski and **Asefa T.**, 2005, Basin-Scale Water Management and Forecasting using Artificial Neural Networks, Journal of American Water Resources Association 41(1):195-208.
- Khalil, A., M. McKee, M. Kemblowski, and **Asefa. T.**, 2005, Sparse Bayesian learning machines for real-time management of reservoir releases, Water Resources Research, 41, W11401, doi:10.1029/2004WR003891.
- **Asefa, T.**, M. W. Kemblowski, G. Urroz, M. McKee, and A. Khalil, 2004, Support vectors–based groundwater head observation networks design, Water Resources Research, 40, W11509, doi:10.1029/2004WR003304.
- Batelaan, O., Van Campenhout, A., **Asefa, T.**, De Smedt, F. and Triest, L., 2002, Groundwater Discharge and Recharges in the Land-use Planning Project of Grote-Nete, 1: Characterization by means of Hydrological Modeling, Vegetation Mapping and GIS (in Dutch), Water, May 2002, pp 1-10. (Abstract in English).
- Batelaan, O., Van Campenhout, A., **Asefa, T.** and De Smedt, F., 2002, Groundwater Discharge and Recharges in the Land-use Planning Project Grote-Nete, 2: Effect of Land-use Changes (in Dutch), Water, June 2002, pp 1-9. (Abstract in English).

Invited Talks

- **Asefa, T.** 2016, How certain could we be? Incorporating demand and supply uncertainties in future supply planning. Invited presentation for Water Research Foundation project WRF-4558: Uncertainties in Long-term Water demand forecasting, January 14th, 2016, Tampa FL.
- **Asefa, T.** 2015, What's in a 21st Century Water Supply Utility's Toolbox? State-of-the practice decision support tools. Environmental & Water Resources Distinguished Speaker Series, Cornell University, Ithaca, NY. October 29, 2015.
- **Asefa, T.** 2015, Robust water supply planning: How certain can we be? The role of uncertainties in demand, supply, and facility availability in future need analysis. USF Environmental & Water Resources Engineering Seminar. January 23, 2015.
- **Asefa, T.** 2014, Integrated water resources management: Planning and practice, USF School of Global Sustainability, September 25, 2014.
- **Asefa, T.** 2013, Multi-time scale demand projection: How and why we do it, USF School of Global Sustainability, November 13, 2014.
- **Asefa, T.** and D.J. Polmann, 2012, Climate Change, Climate Variability & Water Supply Management. Florida Association for Water Quality Control (FAWQC) 2012 Conference, June 12-15, 2012. Naples, FL.
- **Asefa, T.** 2012, Framework for Evaluating a Complex Water Resources Performance under a Changing Climate. Hydrology of the Everglades in the Context of Climate Change, Florida Atlantic University, Davie, FL, March 29-30, 2012.

- **Asefa, T.** 2011, Challenges and Opportunities Incorporating Climate Variability & Climate Change into Water Resource Management Decisions. ASCE – Florida west coast branch 60th Anniversary Celebration, Tampa, FL, August 25, 2011.
- **Asefa, T.**, Clayton, J., Adams, A. and Anderson, D., 2011. Performance Evaluation of a Water Resources System under Varying Climatic Conditions: Reliability, Resilience, Vulnerability and Beyond. In: *Climate Information for Managing Risk (CIMR)*, Orlando, Florida, May 24 – 27, 2011.
- **Asefa, T.** and Adams, A., 2006, Multi-time scale rainfall forecasting/simulation for Tampa Bay Water, Impact of long-term climate change on regional modeling, workshop hosted by South Florida Water Management District, West Palm Beach, Florida, August 15, 2006.

Refereed and Non-refereed Conference Publications

- Clayton, J., **T. Asefa**, A. Adams, A. Anderson, 2010, Interannual-to-Daily Multiscale Stream Flow Models with Climate Effects to Simulate Surface Water Supply Availability, In: *Innovations in Watershed Management under Land Use and Climate Change*. Proceeding of the 2010 Watershed Management Conference, ASCE.
- **Asefa, T.** and Adams, A. 2007. Short-term urban water demand forecasting models in action: Challenges from model development to implementation to real-time operation, ASCE World Environmental & Water Resources Congress, May 15-19, Tampa, Florida.
- **Asefa, T.**, Batelaan, O., Van Campenhout, A., De Smedt, F., 2000, *Characterizing recharge and discharge areas of Grote-Nete (Belgium) using hydrological modeling, vegetation-mapping and GIS*. In: Verhoest, N.E.C., Van Herpe, Y.J.P. and De Troch, F.P. (eds), European Network of Experimental and Representative Basins (ERB) Conference: Monitoring and Modeling Catchments Water Quantity and Quality, Ghent, Belgium, 27-29 September, 2000, pp. 233-237.
- Batelaan, O., **Asefa, T.**, van Rossum, P., De Smedt, F., 2000, *Groundwater flow modeling of three wetland ecosystems in river valleys in Flanders, Belgium*. In: Verhoest, N.E.C., Van Herpe, Y.J.P. and De Troch, F.P. (eds), European Network of Experimental and Representative Basins (ERB) Conference: Monitoring and Modeling Catchments Water Quantity and Quality, Ghent, Belgium, 27-29 September, 2000, pp. 239-243.
- van Rossum, P., **Asefa, T.**, Batelaan, O. Huybrechts, W., De Becker, P., De Smedt, F., 2000, *Hydrogeochemistry of three wetland ecosystems in river valleys in Flanders, Belgium*. In: Verhoest, N.E.C., Van Herpe, Y.J.P. and De Troch, F.P. (eds), European Network of Experimental and Representative Basins (ERB) Conference: Monitoring and Modeling Catchments Water Quantity and Quality, Ghent, Belgium, 27-29 September, 2000, pp. 65-69.
- Batelaan, O., **Asefa, T.**, Van Campenhout, A., De Smedt, F., 2000, *Studying impact of land-use changes on discharge and recharge areas*. In: Verhoest, N.E.C., Van Herpe, Y.J.P. and De Troch, F.P. (eds), European Network of Experimental and Representative Basins (ERB) Conference: Monitoring and Modeling Catchments Water Quantity and Quality, Ghent, Belgium, 27-29 September, 2000, pp. 215-218.
- **Asefa, T.**, Wang, Z., Batelaan, O. and De Smedt, F., 1999, *Open integration of a spatial water balance model and GIS to study the response of a catchment*. Proceedings of the Nineteenth Annual American Geophysical Union Hydrology Days, Ed. Morel-Seytoux, H.J., August 16-20, 1999, Colorado State University, Fort Collins, Colorado. pp. 11-22.

Conference Presentation

- **Asefa T.** 2017. Collaborative applied research in climate change impact assessment. America Water Resources Association Specialty conference. June 25 – 28, 2017. Tysons, VA.

- Clayton, J., **Asefa T.**, L. Wang and M. Lall, 2015. A framework for integrated financial and water supply management at Tampa Bay Water. AWWA ACE 15 Conference, June 5-10, 2015, Anaheim, CA.
- **Asefa T.**, N. Wanakule and A. Adams, 2015. Robust water supply planning: Incorporating demand, supply, level-of-service, and facility-availability uncertainties in determining future supply needs. American Association of Water Resources Spring Conference, March 30-April 1, 2015, Los Angeles, CA.
- **Asefa T.** and A. Adams, Coping with uncertainties in CMIP5 precipitation projections: A case study from west central Florida, 4th UF Water Institute Symposium, Feb 11-12, 2014, Gainesville, FL.
- Tian, D., C. J. Martinez, and **T. Asefa**, Improving municipal water demand forecast using retrospective forecast of a global numerical weather prediction model, 4th UF Water Institute Symposium, Feb 11-12, 2014, Gainesville, FL.
- Tian, D., C. J. Martinez, and **T. Asefa**, Forecasting municipal water demand based on the Global Ensemble Forecast System. To be presented at the 28th Conference on Hydrology – 2014 AMS Annual Meeting, Feb 2-6, 2014, Atlanta, GA.
- Tian, D., C. J. Martinez, and **T. Asefa**, Improving water demand forecasts using retrospective forecast analogs in the Tampa Bay region. To be presented at the AGU Fall Meeting. Dec 9-13, 2013, San Francisco, CA.
- **Asefa, T.** and Adams, A. 2010. A “Predictor-Corrector” Framework for Aggregating Nino 3.4 Forecast for use in Local Rainfall Simulations. University of Florida Water Institute Symposium, February 24-25, Gainesville, Florida.
- Abebe, S. and **Asefa, T.** 2010. Conditional Markov Mixture Models for Seasonal Rainfall Simulation. University of Florida Water Institute Symposium, February 24-25, Gainesville, Florida
- **Asefa, T.** and Adams, A. 2009. Seasonal Markov Mixture Models for rainfall amount: Implications of Climate States. *34th Annual Climate Diagnostic and Prediction Workshop*, Monterey, CA, October 26-30, 2009.
- **Asefa, T.** and A. Adams, 2008. Rainfall Characteristics of Central Florida: Implications to Short- and Long-Term management Decisions. UF Water Institute Symposium, *Sustainable Water Resources*, February 26 – 27, Gainesville, FL
- Newman, M. C. Martinez, W. Graham, J. Jones, **T. Asefa**, and A. Adams, 2007. Use of seasonal climate forecasts for improving regional public water supply management. NOAA's *32nd Annual Climate Diagnostics and Prediction Workshop (CDPW)* October 22-26, 2007 Center for Atmospheric/Prediction Studies (COAPS) , Tallahassee, FL 32303
- Martinez, C., M. Newman, J. Jones¹, W. Graham, **T. Asefa**, and A. Adams, 2007 Relationships between Pacific and Atlantic sea surface temperatures and monthly precipitation in Southwest Florida. NOAA's *32nd Annual Climate Diagnostics and Prediction Workshop (CDPW)* October 22-26, 2007 Center for Atmospheric/Prediction Studies (COAPS) , Tallahassee, FL 32303
- Gill K., **T. Asefa** and M. McKee, 2006, Assessing performances of learning machines when trained with incomplete data. *Hydrology Days 2006*, March 20 -22, Colorado State University, Fort Collins, Colorado, U.S.A.
- **Asefa, T.**, 2005, Non-Linear state-space reconstruction using learning machines, American Water Resources Association (AWRA), Nov 7-10, 2005, Seattle, Washington, U.S.A.
- **Asefa, T.**, Wanakule, N. and Adams, A, 2005, Field-Scale Water Level predictions Using Artificial Neural Networks, American Water Resources Association (AWRA), Nov 7-10, 2005, Seattle, Washington, U.S.A.

- **Asefa, T** and Kemblowski, WM, 2004, Stream Flow Prediction using Support Vector Machines, Spring Runoff Conference, 1st Utah State University Water Initiative Annual Conference: *“Managing Water Resources, Quantity and Quality.”* March 25-26, 2004.
- **Asefa, T** and Kemblowski, WM, 2003a, Multi-time scale stream flow prediction using Support Vector Machines, American Water Resources Association (AWRA), Nov 3-6, 2003, San Diego, California, U.S.A.
- **Asefa, T**, and Kemblowski, WM, 2003b, *Methods for Forecasting Long-Term Stream Flows*. In: *Drought Management: Reflection and preparation*. 31th Annual Section Conference, American Water Resources Association (AWRA), May 20, 2003, Salt Lake City, Utah, U.S.A.
- **Asefa, T** and Kemblowski, W.M., 2003c, Support Vector Machines for monitoring network design. INRA 2003 Subsurface Science symposium, Oct. 6-8, Salt Lake City, Utah, U.S.A.
- Gill MK, Shu, Q., **T Asefa** and Kemblowski, W.M., 2003d, Soil moisture prediction using Support Vector Machines. INRA 2003 Subsurface Science Symposium, Oct. 6-8, Salt Lake City, Utah, U.S.A.
- **Asefa, T** and Kemblowski, W.M., 2002a, Support Vector Machines Approximation of Flow and Transport Models in Initial Groundwater Contamination Network Design, *Eos. Trans. AGU. 83(47)*, Fall Meet. Suppl., Abstract H72D-0882, 2002.
- Huybrechts, W., De Becker, Keppens, V., P., Joris, I., Hubrechts, L., Jacques, D., Feyen, J., van Rossum, P., **Asefa, T.**, Wang, Z.M., Batelaan, O. and De Smedt, F., 2002, Ecohydrological research of wetland ecosystems in river valleys in Flanders (in Dutch), Brussels, Belgium, 26-4-2002b.