**David McGraw**
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**Education**

M.S. Hydrogeology — University of Nevada, Reno
B.S. Civil and Environmental Engineering — University of Wisconsin, Madison

**Professional Experience**

1998-2021 ***Research Scientist, Desert Research Institute***

The Desert Research Institute (DRI) is a non-profit environmental research organization in the Nevada System of Higher Education. As a faculty member at DRI for over 22 years I had the privilege of working on a wide variety of projects, both as a principal investigator and in support of other PIs. A common theme to all my work at DRI is solving problems for our clients using data science, modeling, and writing custom software. Some of my recent achievements include:

- Increasing productivity, efficiency, and safety of crane operations by providing a hyper-local high-resolution wind forecast from downscaled global climate forecasts (GFS). Developed and maintained every component of an automated, twice-daily forecasting engine, including running global climate models using WRF on a cluster, pre- and post-processing input and results, delivering results to networked data storage through a message queue, and continuous monitoring of every component of the process for anomalous behavior or results.
- Developing a real-time, cloud-based traffic prediction platform to predict congestion and speed for autonomous vehicle data. Trained and deployed a deep autoregressive neural network to generate real-time predictions. Developed the platform on AWS using custom python and bash code on EC2, the Kinesis streaming platform with Lambda applications calling a Sagemaker (ML) instance, and with short-term results stored in DynamoDB and archived to S3.
- Analysis and optimization of a weather observation system by downscaling ten years of global climate data and analyzing for areas of redundancy. Developed the custom python code to run the downscaling simulations on a cluster (resulting in three months of continuous simulation) and analyze 14Tb of model results to perform all time series and correlation analyses.

1997-1998 ***Civil Engineer/Hydrologist, Harding and Lawson Associates***

I performed hydrologic and hydraulic analyses for highway development, dam break analyses for public safety, and general civil engineering support.

1992-1995 ***Civil Engineer/Hydrologist, Mead & Hunt, Inc.***

As a civil engineer and modeler, I developed hydraulic and hydrologic models for probable maximum flood studies, dam failure analyses, and floodplain delineation for the hydropower industry. I developed in-house automation code for open-source modeling software (HEC1, HEC2, UNET, DAMBRK) and performed Monte Carlo and sensitivity runs.

**Relevant Skills**

***Languages and Technologies***: Python, R, SQL, shell, pandas, geopandas, numpy, scikit-learn, xarray, dask, matplotlib, flask, AWS (S3, Lambda, Aurora, DynamoDB, EC2, Kinesis, Sagemaker), Git, Bitbucket, JIRA, RabbitMQ, InfluxDB, Telegraf, Grafana, Linux/Unix

***Analysis and Modeling***: general data analysis, statistical inference, multivariate regression, machine learning, data visualization, custom predictive models, finite difference models, time series prediction, bias correction, exploratory data analysis

***Domain expertise***: hydrology, hydraulics, environmental science, atmospheric science, geochemical modeling, engineering, highway traffic

**Selected Publications, Reports, and Presentations**


Roj, S., McEvoy, D., **McGraw, D.**, Huntington, J., Hobbins, M., Dunkerly, C., 2021 (in preparation). Validating Forecast Reference Evapotranspiration Using the Nevada Integrated Climate and Evapotranspiration Network. *Agricultural Water Management.*

**McGraw, D. S.**, Carroll, R. W., Pohll, G. M., Chapman, J. B., Bacon, S. N., Jasoni, R. L., 2016. Groundwater Resource Sustainability: Modeling Evaluation for the Naval Air Weapons Station, China Lake, California, *Naval Air Warfare Center Weapons Division Technical report, NAWCWD TP 8811*.

**McGraw, D. S.**, Hershey, R. L., 2016. Application of Monte Carlo Methods to Perform Uncertainty and Sensitivity Analysis on Inverse Water-Rock Reactions with NETPATH, *Desert Research Institute Publication* No. 45267.

Huntington, J., C. Morton, **D. McGraw**, G. Pohll, 2013. Remote Sensing of Evapotranspiration for Groundwater Recharge Estimation from Irrigated Lands. *Fall Meeting, American Geophysical Union*.

McGwire, K. C., Weltz, M., Finzel, J., Morris, C., Fenstermaker, L.F., **McGraw, D. S.**, 2013. Multiscale Assessment of Green Leaf Area in a Semi-Arid Rangeland with a Small Unmanned Aerial Vehicle, *International Journal of Remote Sensing*, 34, 1615-1632

**McGraw, D. S.**, Pohll, G. M., Schumer, R., Shanafield, M., 2011. Development of tools to estimate Truckee River conveyance losses, *Hydrogeology Journal*, 10.1007/s10040-010-0701-2

Jia, L., M. Stone, G. Pohll, **D. McGraw**, 2010. Response of riparian evapotranspiration to groundwater fluctuations. *World Environmental & Water Resources Congress, EWRI.* Providence, R.I.

Carroll, R. W., Pohll, G. M., **McGraw, D. S.**, Garner, C. B., Knust, A. M., Boyle, D. P., Minor, T. B., Bassett, S., Pohlmann, K. F. (2010). Mason Valley Groundwater Model: Linking Surface Water and Groundwater in the Walker River Basin, Nevada, *Journal of American Water Resources Association*, 46 (3), 554-573, 10.1111/j.1752-1688.2010.00434.x

Boyle, D.P., T. Minor, G. Pohll, A. Knust, C. Garner, R. Carroll, **D. McGraw**, S. Basset, C. Barth, D. Norpchen, A. Stroud, 2009. Development and testing of a decision support tool in support of water right acquisitions in the Walker River Basin. *International Symposium on Terminus Lakes.* NSHE: Walker Basin Project, Reno, NV.

**McGraw, D**., R. Schumer, P.L. Oberlander, 2007. Non-parametric statistical methods for evaluating heavily-censored hydraulic conductivity data. *Spring Meeting, AGU.* Acapulco, Mexico.

Dahan, O., **D. McGraw**, E. Adar, G. Pohll, B. Bohm, J. Thomas, 2004. Multi-variable mixing cell model as a calibration and validation tool for hydrogeologic groundwater modeling. *Journal of Hydrology 293 (2004) 115-136.*