Andrew Joros

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Summary

Research computing engineer specializing in AI/ML, cloud computing, and data engineering for environmental science applications. Over 12 years developing end-to-end analytical pipelines—from CFD simulations and machine learning models to AI-enhanced analysis and real-time monitoring dashboards—supporting climate research, water resource management, genomics, and wildfire modeling across federal, state, and academic partners.

Experience

Research Computing Engineer (Software Development / Data Scientist) 2024 – Current

Division of Atmospheric Science / Division of Hydrologic Sciences, Desert Research Institute *Reno, NV*

- Western US Spring Heatwave Circulation Pattern Analysis: Apply Self-Organizing Map (SOM) machine learning to classify 55 western U.S. heatwave events (1981–2015) into four circulation patterns using 20CRv3 data, ensuring statistical robustness and producing high-quality visualization outputs
- CFD Snow Transport/Drift Machine Learning Project: Develop a data-engineering pipeline converting OpenFOAM CFD simulations into optimized analytical formats, enabling machine-learning models to predict snow transport and drift under varying wind conditions
- Snowpack Runoff Situational Awareness Site: Enhance Python visualization tools to integrate SNOTEL and CDEC data, generate automated 7-day snow and soil moisture trend plots, and support real-time hydrologic monitoring
- County Water Planning Project: Automate groundwater-use analysis across Nevada's 262 hydrographic basins, creating standardized visual reports and Python workflows to support statewide community water-resource planning
- Nevada Probable Maximum Precipitation (PMP) Project: Helped develop the Nevada PMP Explorer web app in ArcGIS Experience Builder, integrating raster visualization, watershed delineation, and zonal analysis tools to aid statewide precipitation design and planning

Research Computing Engineer (Cloud Computing / Data Scientist) 2019 – 2023

Center for Genomic Medicine & Climate Ecosystem Fire Applications, Desert Research Institute *Reno, NV*

- Provided cloud computing and data engineering support for genetic analysis projects
- Worked with team members on cloud-based data engineering and statistical projects, improving productivity
- Led AWS onboarding and training, enhancing the team's cloud computing skills
- Created AWS-based solutions for statistical smoke dispersion models for California's fire management
- Developed a dynamic front-end webpage using AWS, presenting statistical modeling outputs related to Interagency Wildland Fire Air Quality, empowering stakeholders with valuable insights into air quality conditions

Staff Research Scientist (Software Development / Data Scientist) 2016 – 2019

Applied Innovation Center, Desert Research Institute *Reno, NV*

- Developed water surveying software for groundwater assessment using vertical electrical sounding, enhancing well siting and drilling
- Contributed to the construction of meteorological and air pollutant data pipeline, aiding environmental research for the Healthy Nevada Project
- Integrated Christopher Ranch's sensor data into AWS for storage and machine learning use
- Leveraged AWS EC2 to devise and implement cutting-edge agricultural insect and disease probabilistic models, empowering customers with accurate predictions for effective pest management and crop protection
- Created an automated AWS sensor alert system for data integrity and reliability

Assistant Research Scientist (High Performance Computing) 2015 – 2016

Applied Innovation Center, Desert Research Institute *Reno, NV*

- Constructed backend data architecture for the WINDS platform, improving weather data processing and decision support
- Developed a web portal for NDOT, enabling engineers to access and analyze traffic data for transportation planning
- Led NevCAN's data visualization project, presenting real-time climate and ecological data effectively
- Created an image processing algorithm for greenhouse experiments to analyze vegetation health and growth

Staff Scientist Programmer, Hydrometeorologist 2013 – 2015
Desert Research Institute *Reno, NV*

- Used Earth Engine JavaScript API for geospatial data analysis in hydrometeorology
- Contributed to the Climate and Integrated Earth Monitoring Engine dashboard, enhancing environmental data visualization
- Processed Landsat and weather data via cloud computing, aiding Nevada's ecosystem analysis and conservation
- Evaluated precipitation datasets against Texas weather stations to improve irrigation and water management

Research Assistant 2009 – 2013
Desert Research Institute *Reno, NV*

- Investigated monsoonal surges in the Northern Great Basin using statistical and dynamic methods
- Improved weather datasets to better represent irrigated agricultural environments
- Worked with CEFA to create a RAWS network density plot, aiding land managers' decisions
- Developed web frameworks for NOAA-funded drought monitoring and an El Nino climate risk project

Statistical Analyst Summer 2009
Atmospheric Systems Corporation *Valencia, CA*

- Conducted statistical quality assurance and quality control (QA/QC) of output data from Sonic Detection and Ranging (SODAR) systems

Education

University of Nevada Reno, NV
M.S. in Atmospheric Science *2009 – 2011*

San Jose State University San Jose, CA
B.S. in Meteorology *2006 – 2009*

Skills

Programming Languages: Python, MATLAB, R, Java, C/C++, FORTRAN, Scala
Software Frameworks: Apache Hadoop, Apache Spark, Cloudera CDH, ArcGIS
Web Design (Frontend): HTML5, CSS, Adobe Creative Suite, JavaScript, Highcharts
Web Design (Backend): PHP, MySQL, Flask, Django, XAMPP
Cloud Platforms: Amazon Web Services, Google Cloud Platform, Azure
Operating Systems: Linux (Ubuntu/CentOS/Redhat), Windows

Publications and Reports

1. Luo, S., Jiang, R., Grzymski, J.J., Lee, W., & Joros, A. (2021). Comprehensive allele genotyping in critical pharmacogenes reduces residual clinical risk in diverse populations. Clinical Pharmacology & Therapeutics, 110(4), 899–911.

2. Kiser, D., Metcalf, W.J., Elhanan, G., Schnieder, B., Schlauch, K., Joros, A., Petersen, C. and Grzymski, J., 2020. Particulate matter and emergency visits for asthma: a time-series study of their association in the presence and absence of wildfire smoke in Reno, Nevada, 2013–2018. Environmental Health, 19(1), pp.1-12.

3. Nauslar, N.J., Hatchett, B.J., Brown, T.J., & Joros, A. (2019). Impact of the North American monsoon on wildfire activity in the southwest United States. International Journal of Climatology, 39(4), 1861–1879.

4. Abatzoglou, J.T., McEvoy, D.J., Joros, A., et al. (2017). The West Wide Drought Tracker: Drought Monitoring at Fine Spatial Scales. Bulletin of the American Meteorological Society, 98(9), 1815–1820.

5. Caldwell, T. G., Huntington, J. L., Scanlon, B., Joros, A. N., Howard, T., (2017): Improving Irrigation Water Use Estimates with Remote Sensing Technologies: An Initial Feasibility Study for Texas, 137 p., University of Texas, Bureau of Economic Geology: Austin, TX, Report prepared for Texas Water Development Board.

6. Joros, A., J. Abatzoglou, N. Nauslar, B. Hatchett, M. Kaplan, (2017) Extratropical Control of Monsoonal Surges in the Great Basin. Monthly Weather Review (In Progress)

7. Huntington, J. L., Gangopadhyay, S., Spears, M., Allen, R., King, D. L., Morton, C. G., Harrison, A., McEvoy, D. J., Joros, A. N., (2015): West-Wide Climate Risk Assessments: Irrigation Demand and Reservoir Evaporation Projections, Technical memorandum No. 68-68210-2014-01, 218 p, 754 appx, U.S. Bureau of Reclamation

8. Morton, C. G., Huntington, J. L., Allen, R. G., Kilic, A., Joros, A. N., (2015): More Landsat Satellites Equates to More Reliable Monitoring of Water Consumption, Remote Sensing, Submitted

9. Brown, T., Larkin, N.K., Rorig, M., & Joros, A. (2013). Improving Meteorological Data and Forecasts for Prescribed Fire Burn Day Decisions for the Lake Tahoe Basin. CEFA Final Report (SNPLMA).

10. Joros, A., M. Kaplan, J. Abatzoglou (2011) Extratropical Control of Monsoonal Surges in the Great Basin. (Master's Thesis)

Conference Papers/Presentations

1. Rowan, C., Metcalf, W. J., Elhanan, G., Joros, A. N., & Grzymski, J. J. (2018). Short-Term Sentinel Air Events in Relation to Health Care Utilization for Specific Health Conditions in Reno, Nevada. In B24. AN UPDATE ON INDOOR AND OUTDOOR AIR POLLUTION (pp. A2815-A2815). American Thoracic Society.

2. Rosenquist, N. A., Metcalf, J., Elhanan, G., Grzymski, J., Joros, A. N., Field-Ridley, A., & Darrow, L. A. (2018, August). Acute Associations between PM2. 5 and Allergic and Nonallergic Asthma Exacerbations in Children and Adults. In ISEE Conference Abstracts (Vol. 2018, No. 1).

3. Hegewisch, K., Daudert, B., Morton, C. G., Peterson, A., Joros, A. N., McEvoy, D. J., Erickson, T., Huntington, J. L., Abatzoglou, J. T. (2015). Google Drought Monitoring Through Cloud Computing and Visualization of Remote Sensing and Meteorological Datasets: Examples for California, American Geophysical Union Chapman Conference: Irvine, CA, April 20, 2015-April 22, 2015

4. Huntington, J. L., Daudert, B., Morton, C. G., McEvoy, D. J., Joros, A. N., Abatzoglou, J. T., Hegewisch, K., Peterson, A., Vansant, D. S., Allen, R., Kilic, A., Hobbins, M., Verdin, J. (2015). Cloud Computing for Drought Monitoring with Google Earth Engine, U.S. Drought Monitor Forum: Desert Research Institute, Reno, NV, April 14, 2015-April 16, 2015

5. Huntington, J. L., Gangopadhyay, S., Spears, M., Allen, R., King, D. L., Morton, C. G., Harrison, A., McEvoy, D. J., Joros, A. N. (2015). West-Wide Climate Risk Assessments: Irrigation Demand and Reservoir Evaporation Projections, Technical memorandum No. 68-68210-2014-01, 218 p, 754 appx, U.S. Bureau of Reclamation

6. Morton, C. G., Huntington, J. L., Allen, R. G., Kilic, A., Joros, A. N. (2015). More Landsat Satellites Equates to More Reliable Monitoring of Water Consumption, Remote Sensing, Submitted

7. Huntington, J. L., Morton, C. G., McGwire, K. C., Allen, R., Gorelick, N., Thau, D., Joros, A. N. (2014). Monitoring Groundwater Dependent Ecosystems in the Great Basin from Space and Clouds, American Water Resources Association Summer Specialty Conference: Reno, NV, May 31, 0014-July 2, 2014

8. Huntington, J. L., Morton, C. G., McGwire, K. C., Joros, A. N., Peterson, S., Gorelick, N., Thau, D., Allen, R. (2014). Cloud Computing of Landsat Imagery and Gridded Weather Data for Evaluating Groundwater Dependent Ecosystems in Nevada, Nevada Water Resources Association Annual Conference: Las Vegas, NV, February 2, 2014-February 2, 2014

9. Huntington, J. L., Morton, C. G., McGwire, K. C., Joros, A. N., Peterson, S., Gorelick, N., Thau, D., Allen, R., 2013: Utilizing Cloud Computing of Landsat Imagery and Gridded Weather Data for Evaluating Groundwater Dependent Ecosystems in Nevada. Nevada Water Resources Association Annual Conference, Las Vegas, NV, 3-6 February 2014

10. Richard G. Allen, University of Idaho, Kimberly, ID; and J. L. Huntington, A. Kilic, H. Debruin, and A. Joros, (2013): Conditioning of NLDAS, NARR and arid weather station data to improve their representation of well-watered (reference) environments associated with irrigated agriculture. 93rd AMS Annual Meeting, 27th Conference on Hydrology, Austin, TX, 5-10 January 2013

11. Kelly T. Redmond, DRI, Reno, NV; and J.T. Abatzoglou, D. McEvoy, A. Joros, D. VanSant, and L. M. Edward, (2013): The WestWide Drought Tracker: Drought Monitoring at Fine Spatial Scales 93rd AMS Annual Meeting, Austin, TX, 5-10 January 2013

12. Nauslar, Nick, J. Abatzoglou, A. Joros (2011): Development of an objective methodology for diagnosing Santa Ana winds. Ninth Symposium on Fire and Forest Meteorology, Palm Springs, CA, 18-20 October 2011

13. Joros, A., J. F. Mejia (2011): Impact of Eastern and Central Pacific ENSO events over the Continental United States. AMS Applied Climatology Conference 2011, Asheville, North Carolina, 18–20 July 2011

14. King, K. C., M. L. Kaplan, A. Joros, M. Liddle and E. Uher, (2011): Evaluation of the Operational Multi-scale Environment model with Grid Adaptivity (OMEGA) for use in Wind Energy Potential Assessment in the Great Basin of Nevada. Weather, Climate, and the New Energy Economy - Observations, Modeling, and Data for the Energy Sector. 91st AMS Annual Meeting, Seattle WA, 23-27 January 2010.

15. Abatzoglou, J.T., K.T. Redmond, L.M. Edwards and A. Joros (2011): Monitoring of drought in the western United States: metrics suitable for tracking drought historically and throughout the 21st century. 91st AMS Annual Meeting, Seattle WA, 23-27 January 2010.

16. Joros, A., J. Abatzoglou, J. Favors, B. Tan, M. Kaplan (2010): Extratropical Control of Monsoonal Surges into the Great Basin. AMS Mountain Meteorology Conference, Lake Tahoe, CA, 30 August – 3 September 2010.

17. Tan, B., A. Joros, and M. L. Kaplan, (2010): The Role of Midlatitude Circulations in Triggering Extratropical Convection during the 2004 North American Monsoon. 90th AMS Annual Meeting, Atlanta, GA, 17-22 January 2010.

18. King, K.C., M. Kaplan, A. Joros, M. Liddle, E. Uher (2010): Evaluation of the Operation Multiscale Model with Grid Adaptivity (OMEGA) for use in Wind Energy Potential Assessment in the Great Basin of Nevada. AMS Mountain Meteorology Conference, Lake Tahoe, CA, 30 August – 3 September 2010.

19. Uher, Erich, M. Kaplan, A. Joros, D. Decker (2010) Air Pollution Dispersion Forecasting: A Climatological Study of Cape Canaveral Tropospheric Wind Patterns. 90th AMS Annual Meeting, Atlanta, GA, 17-22 January 2010.