FLOW LLC

Frontier Logic in Observational Water LLC

Environmental Consulting · Data Science · Machine Learning

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PhD-Led Environmental Consulting Powered by Advanced Analytics

Peer-reviewed science · Machine learning · GIS/Remote sensing · Direct PhD execution on every project

305+ CITATIONS **14+** PAPERS **9** H-INDEX

CORE CAPABILITIES

Water Quality Analysis & TMDL
Nutrient loading, DOC dynamics, NPDES compliance, MS4 monitoring, water quality trend analysis, TMDL development support

Watershed & Hydrological Modeling
SWAT/SWMM calibration & scenario analysis, streamflow prediction, sediment transport, dam inflow forecasting, climate impact

Machine Learning & Predictive Analytics
XGBoost, deep learning (LSTM/CNN), Bayesian optimization, WGAN data augmentation. Published models in ES&T and JGR

GIS & Remote Sensing
ArcGIS Pro, QGIS, Google Earth Engine, Landsat/Sentinel analysis, land cover classification, LiDAR, spatial statistics

Environmental Consulting & Compliance
Phase I/II ESA, stormwater management, NEPA review, BMP evaluation, regulatory compliance guidance

PAST PERFORMANCE

NASA-Funded DOC Research — Boston University
4-year full fellowship. Led DOC dynamics research in Arctic watersheds and coastal estuaries using remote sensing + ML. Published in ES&T (IF 11.4) and JGR: Biogeosciences.

National Institute of Environmental Research — Korean EPA
Full-time researcher. Led TMDL support, watershed water quality assessments, BMP evaluation, and regulatory compliance for national programs.

Multi-Dam Inflow Prediction System
Combined ML ensemble (RF + XGBoost + LSTM) for dam inflow forecasting. Published in Water (75 citations). Applied to 5+ national dams.

Rainfall Erosivity & Soil Loss Modeling
Bayesian-optimized ML for rainfall erosivity across Italy/Switzerland. Published in CATENA (51 citations). Applicable to RUSLE2 frameworks.

TYPICAL DELIVERABLES

- Technical reports (TMDL, water quality assessment, watershed analysis)
- Calibrated models (SWAT, SWMM, ML prediction models) with full documentation
- GIS deliverables (geodatabases, map products, spatial analysis layers)
- Data dashboards & automated monitoring pipelines
- Peer-review-ready manuscripts and white papers
- Regulatory compliance documentation (NPDES, MS4, stormwater)

QA/QC & AVAILABILITY

Quality: All analyses follow peer-reviewed methodologies. Statistical validation, sensitivity testing, and reproducible workflows standard on every project.

Availability: Can mobilize within 1–2 weeks. Flexible scheduling for urgent task orders.

Insurance: Professional liability (E&O) and general liability coverage.

Communication: Weekly progress reports, milestone-based invoicing, direct access to PI at all times.

WHY CHOOSE FLOW

- ✓ **Direct PhD Execution** — Every project led personally by Dr. Hong. No subcontracting, no PM layers.
- ✓ **Proven Track Record** — 305+ citations, 14+ papers in ES&T (IF 11.4), JGR, CATENA, and more.
- ✓ **NASA-Funded Pedigree** — 4-year full NASA fellowship at Boston University.
- ✓ **AI + Domain Expertise** — ML models built by someone who understands the environmental physics.
- ✓ **Government Lab Experience** — National EPA-equivalent lab. Understands TMDL, regulatory deliverables.
- ✓ **Cost-Effective** — $120–180/hr vs. $200–350 at large firms. Same PhD quality, lower overhead.
- ✓ **Faster Turnaround** — Direct scientist-to-client. No approval chains.

SELECTED PUBLICATIONS (5 OF 14+)

★ **Top Journal** Improving Estimates of DOC Concentration from In Situ Fluorescence Measurements across Estuaries and Coastal Wetlands. *Environmental Science & Technology* (IF 11.4), 2024

★ **Top Journal** Capturing the Dynamics of DOC in Tidal Saltmarsh Estuaries Using Remote-Sensing-Informed Models. *JGR: Biogeosciences* (AGU), 2025

Development and Evaluation of Combined ML Models for the Prediction of Dam Inflow. *Water*, 2020 — **75 citations**

Estimation of Rainfall Erosivity Factor Using Bayesian Optimization Based ML Models. *CATENA*, 2022 — **51 citations**

Prediction of Aquatic Ecosystem Health Indices through ML Models Using WGAN-Based Data Augmentation. *Sustainability*, 2021 — **33 citations**

EDUCATION & CREDENTIALS

Ph.D., Environmental Science — Boston University (NASA Research Fellow)

CERTIFICATIONS & REGISTRATIONS

WBE (In Review) · MBE (In Review) · DBE (In Review) · Small Business · SAM.gov Registered

Woman-Owned · Minority-Owned · Small Business · DUNS/UEI Registered

NAICS CODES

541620 — Environmental Consulting
541690 — Scientific/Technical Consulting
541380 — Testing Laboratories
541990 — Other Professional Services
541370 — Surveying & Mapping (GIS)
541715 — R&D Physical Sciences
541330 — Engineering Services
562910 — Environmental Remediation

TECHNICAL TOOLS & PLATFORMS

Programming: Python, R, SQL, MATLAB
ML/AI: TensorFlow, PyTorch, scikit-learn, XGBoost, LightGBM
GIS/RS: ArcGIS Pro, QGIS, Google Earth Engine, ENVI
Modeling: SWAT, SWMM, HEC-RAS, MODFLOW, RUSLE2
Cloud/DB: AWS (S3, Lambda, SageMaker), PostgreSQL/PostGIS, Tableau
Data Sources: Landsat, Sentinel-2, MODIS, EPA STORET, USGS NWIS

SERVICE AREAS & TEAMING

Geography: Massachusetts, New England, Northeast US (remote nationwide)

Clients: State DEPs, EPA, municipal DPWs, water utilities, Army Corps, USGS, engineering firms

Project Size: $10K+ (task orders, sub-consulting, standalone analyses, multi-year contracts)

Teaming: Actively seeking partnerships with prime contractors. PhD-level specialist for water quality, ML/AI, and GIS. Available as WBE/MBE subcontractor to help meet diversity goals.