

## PhD-Led Environmental Consulting Powered by Advanced Analytics

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

305+ 14+ 9

CITATIONS PAPERS H-INDEX

## CORE CAPABILITIES

## Water Quality Analysis &amp; TMDL

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

## Watershed &amp; Hydrological Modeling

SWAT/SWMM calibration &amp; scenario analysis, streamflow prediction, sediment transport, dam inflow forecasting, climate impact

## Machine Learning &amp; Predictive Analytics

XGBoost, deep learning (LSTM/CNN), Bayesian optimization, WGAN data augmentation. Published models in ES&amp;T and JGR

## GIS &amp; Remote Sensing

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

## Environmental Consulting &amp; 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&amp;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 &amp; 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 &amp; 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 &amp; CREDENTIALS

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

## CERTIFICATIONS &amp; 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

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

## TECHNICAL TOOLS &amp; 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 &amp; 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.