

Cooperative Institute for Research to Operations in Hydrology



A summary of activity at the University of Vermont

CIROH is a national consortium of universities, private sector companies, and research institutes advancing water prediction – **the forecasting of streamflow, extreme floods and droughts, and water quality** – and building community resilience to water-related challenges.

CIROH scientists are improving operational hydrologic forecasting techniques and workflows, community water modeling, the translation of forecasts into actionable information, and the use of water predictions in decision making.

CIROH @ UVM

The University of Vermont, led by the Water Resources Institute (WRI), is one of 28 member and partner organizations across the United States. leading CIROH research to enhance our understanding of water resources modeling and communication.

UVM's Research Contributions to CIROH:

1. Addressing forecasting challenges for montane headwaters, snow dominated settings, & groundwater-dependent systems
2. Better representing river channels and floodplains to improve flow routing and flood inundation mapping
3. Enhancing risk perception, flood communications, decision support, and forecast design
4. Extending streamflow predictions to water quality and harmful algal bloom forecasting

Learn more: www.uvm.edu/water/ciroh-uvm.



CIROH @ UVM: BY THE NUMBERS



More than \$16 million in CIROH funding to UVM



29 funded projects since '22



29 students and postdocs supported by CIROH



68 involved faculty members



5 UVM colleges / units represented

Project Title	PI	Unit	Award Period	Amount
Leveraging Emerging Technology to Improve Hydrological Forecasting	A. Schroth	CAS	August '22 - July '25	\$1.5M
Improved Representation of Floodplains and Natural Features for Channel Routing	B. Wemple	CAS	August '22 - July '25	\$2.2M
Integrating Observations and Field Work in Support of Expanded Evaluation Data Testbeds in the Northeast	A. Zia	CALS	August '22 - July '24	\$500k
Enhanced Forecast Design Through Experimental Gaming and Social Impact Assessment	S. Merrill	CALS	August '22 - July '24	\$2.0M
Forecasting the Incidence and Duration of Harmful Algal Blooms	A. Zia	CALS	August '22 - July '25	\$2.2M
Post-processing NWM Output with Spatially Distributed Turbidity Sensing	A. Schroth	CAS	August '22 - July '25	\$749k
Coupling Sensors and Modeling to Inform Water Quality Improvement Targets	A. Schroth	CAS	August '22 - July '25	\$1.5M
Flood Inundation Mapping: Engagement and Testing with Technical Users and Impacted Communities	A. Jefferson	RSENR	June '23 - May '25	\$62k
Optimizing Flood Warning Information Sharing for Local Stakeholders	A. Jefferson	RSENR	June '23 - May '25	\$33k
Advancing Water Quality Monitoring and Prediction Capability of USGS NGWOS Program	A. Schroth	CAS	June '23 - May '26	\$230k
Advancing CONUS-scale Operational Snow Modeling Capabilities	B. Wemple	CAS	June '23 - May '25	\$276k
Modeling Community Trust: A Collaborative Approach to Scoping Water Forecasting Needs	S. Merrill	CALS	June '23 - May '25	\$259k
Novel Geospatial Architecture of Channel and Floodplain Morphological Attributes within the OWP Hydrofabrics	R. Diehl	CAS	June '23 - May '25	\$179k
Advancing Science to Better Characterize Drought and Groundwater-Driven Low-Flow Conditions in NOAA and USGS National-Scale Models	D. Rizzo	CEMS	June '23 – May '25	\$188k
Advancing Snow Observation Systems to Improve Operational Streamflow Prediction Capabilities	C. Skalka	CEMS	June '23 - May '26	\$399k
Flood Resilience Education Through GPT-Guided Gaming with Multi-Scale Built Environment Data	S. Merrill	CALS	July '24 - June '26	\$95k
Exploring Critical Attributes of 3D Channels for Enhanced Probabilistic Flood Inundation Mapping	R. Diehl	CAS	July '24 - June '26	\$149k
Operationalizing A Flexible Model and Data Collection Workflow to Detect Harmful Algal Blooms Using Hyperspectral Imagery and Machine Learning	A. Schroth	CAS	July '24 - March '27	\$166k
Establishing a Coupled Human-Water Systems Modeling Think Tank for Advancing Social Models in Parallel with the NextGen Model	A. Zia	CALS	July '24 - June '25	\$34k
Developing and Integrating a Social Water Use Model to Improve the Predictive Capacity of Water Resource Models	A. Zia	CALS	July '24 - June '25	\$53k
Next Generation Ensembled-Derived Precipitation Estimate for River Forecast Centers	P. Clemins	OVPR	July '25-March '27	\$711k
Evaluating and Improving the Representation of Rain-on-Snow Floods Using the National Water Model and NextGen	K. Jennings	OVPR	July '25 - March '27	\$558k
Implementing Community Trust: A Tabletop Exercise for Emergency Managers	S. Merrill	CALS	July '25 - March '27	\$204k
Identifying the Usefulness of Flood Forecast Attributes in Support of Impact-based Decision-Making	Jefferson	RSENR	July '25 - March '27	\$400k
Pathways to Increase the Effectiveness of Flash Flood Forecasts in Mountain Regions	B. Wemple	CAS	July '25 - March '27	\$128k
Defining Nationally Consistent Fluvial and Pluvial Flood Hazard Severity Thresholds to Improve Risk Communication	E. Doran	CEMS	July '25 - March '27	\$608k
A Think Tank Envisioning CIROH's Unique Opportunities to Advance Water Quality Forecasting	A. Schroth	CAS	July '25 - March '27	\$142k
Scaling Up Recent CIROH Advances in NWM-forced Water Quality Forecasting to Large Basins Across the United States	A. Schroth	CAS	July '25 - March '27	\$610k
Assess the Effectiveness of Communication of Total Water Level Visualizing and Conduct User Testing of Compound Flood Products	A. Jefferson	RSENR	July '25 - March '27	\$75k
Expanding the National Water Model FIM to Support Infrastructure and Impact	A. Jefferson	RSENR	July '25 - March '27	\$75k