



## The Jefferson Project at Lake George



Rensselaer



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### Jefferson Project Deploys State-of-the-Art Science and Technology to Understand Lake George's *FIRST* Harmful Algal Bloom

*Researchers confirm no measurable toxins and pursue answers to additional key questions*

Lake George, N.Y. — As the number of harmful algal blooms (HABs) in New York State lakes dramatically increased, Governor Andrew Cuomo launched a 12-lake Harmful Algal Bloom Initiative in 2017. [The Jefferson Project at Lake George](#), a collaboration between [Rensselaer Polytechnic Institute](#), [IBM Research](#), and [The FUND for Lake George](#), immediately pivoted its significant world-class resources to understand the problem, to help inform policy and actions. In addition to Lake George, the Jefferson Project launched research into HABs on Skaneateles Lake and Chautauqua Lake, two New York lakes that have experienced significant HABs.

Last week, the NY State Department of Environmental Conservation (DEC) confirmed Lake George's first HAB in Harris Bay, verifying that the threshold of cyanobacteria concentrations in excess of 25 micrograms per liter were present. The algal bloom was first observed in Harris Bay on Saturday, Nov. 7, and dissipated that same day. Additional blooms appeared on Monday, Nov. 9, in Harris Bay, Sandy Bay, Warner Bay, and nearshore waters off of Lake George Village, all of which dissipated within 24 hours.

The Jefferson Project immediately deployed additional resources on Lake George. More than 20 researchers collected water samples from across the lake for sophisticated chemical, biological, and computer modeling analyses. They also deployed advanced sensors around the lake (including Harris Bay). In addition, IBM and Rensselaer supercomputers and researchers began computationally modeling recent weather and water circulation at all levels of the lake. All of this effort is aimed at answering three critical questions.

“The *first* question is: Was this a natural event or is this an early warning sign of human activities impacting the lake, due to factors like increasing nutrients or global climate change? Our rapid response to the recent HAB event in Lake George and similar occurrences in lakes across New York State puts us in a unique position to answer those questions and provide insights to decision makers,” said Dr. Rick Relyea, Director of The Jefferson Project and a professor of biological sciences at Rensselaer.

The initial results from Jefferson Project work confirms the widespread existence of *Dolichospermum fuscum* — a cyanobacteria commonly found in Lake George and other lakes in abundance below the lake's surface in autumn — in high concentrations in the recent surface blooms.



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The algae are known to have little pouches — called air vacuoles — that make it possible for them to float in the deep waters of the open lake, but its buoyancy is so weak that it can only rise to the surface under extremely calm conditions. “Since *Dolichospermum* requires at least two days to reproduce, the high density of cyanobacteria observed in Lake George indicates that the algae were likely growing for many days or weeks in the cool water before surfacing. This surfacing during the HAB was likely enabled by calm water conditions and then driven into these bays and nearshore waters off of Lake George Village by wind or water currents according to preliminary computer models” said Dr. Harry Kolar, Jefferson Project Associate Director and IBM fellow. “Further work continues on the source(s) of the algae and nutrients required to trigger and sustain the bloom, including the lakebed and watershed runoff,” he said.

“The *second* important question,” according to Dr. Relyea, is “was this a toxic bloom?” He added, “Some *Dolichospermum* species are capable of producing toxins that irritate the skin and can harm the liver and nervous system and hence we need to know whether the Lake George HAB was toxic (as seen in other lakes).” Analysis of the Jefferson Project water sample has confirmed the initial results of NY DEC — **toxins were not detected**.

Finally, Dr. Relyea adds, “The *third* critical question then remains: While not observed in this bloom, could toxic blooms occur in the future on Lake George?” Jefferson Project research is now fully investigating and delving deeply into the drivers of toxicity in these algae. The work is leveraging Rensselaer’s world-class Center for Biotechnology & Interdisciplinary Studies (CBIS), coupled with IBM’s and Rensselaer’s most advanced sensor networks and supercomputing — the most powerful ever deployed on any freshwater ecosystem. Genetic factors, water chemistry and circulation, environmental effects, and other factors will be investigated to understand what triggers toxicity in these algae in order to inform potential policy and actions to avoid this problem.

“The Jefferson Project is committed to providing the most complete set of deep scientific insights into what causes HABs, so that a holistic set of ‘science to solutions’ guidance can be shared to inform future remediation actions and public policy to protect our freshwater assets and related economic and recreational value in NY State,” said Eric Siy, the Associate Director of the Jefferson Project, and Executive Director of The *FUND* for Lake George.



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