They Followed Fulton with Fuel Cells

Lynne Robinson

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Chicago's O'Hare Airport was not where Will Gathright had planned to get the news.

After roughly nine months of preparation, and the last two weeks embroiled in almost continual troubleshooting, Gathright and his team had hoped he would be positioned on a Hudson River dock to welcome the *New Clermont* home. Instead, standing in an epicenter of fossil fuel transportation, he heard the voice of the *New Clermont's* captain from 800 miles away reporting that the tiny, experimental craft powered by hydrogen had finally completed its journey from Manhattan to Albany, New York.

Still, Gathright, a National Science Foundation IGERT Fellow pursuing a doctorate in fuel cell research at Rensselaer Polytechnic Institute (RPI), was "ecstatic." Gathright is passionate about the role of science in preserving and protecting the environment. That's why, in January 2009, as New York was marking the 200th anniversary of Robert Fulton's successful launch of the world's first commercial steamboat, the *Clermont*, he decided to embody his professional interests in a very public

demonstration of green technology. His concept was straightforward—Build a boat powered by hydrogen fuel cells and then retrace Fulton's historic journey up the Hudson in roughly the same timeframe.

Christening the undertaking the "New Clermont Project," Gathright recruited a team of like-minded students and initially focused efforts on gathering—and then modifying—resources to suit the project. The boat that had been loaned to them—a 40-year-old Bristol Caravel fiberglass sloop—had been sitting in a field on blocks for nearly seven years, with holes drilled in the hull to drain out standing water. Besides the obvious repairs, converting the *New Clermont* from a sailboat to a powerboat driven by hydrogen fuel cells presented its own set of unique challenges. "We encountered a lot of disbelief that this would work, that the boat could carry and move 1,200 pounds of fuel cell technology," said Jennifer Gagner, *New Clermont* team member, third-year doctoral student in RPI's Materials Science and Engineering Department, and a Material Advantage member.

Despite numerous engineering and logistics challenges, the *New Clermont* team had the vessel equipped and ready to go less than nine months from Gath-

right's initial brainstorm. Its journey was to begin on September 21, 2009, in Manhattan and end on September 25 in Troy, about 10 miles past Albany, with stops along the way for media and educational events. Like Fulton's *Clermont*, the RPI vessel would travel at about five miles per hour in an attempt to show the viability of a new transportation technology. The similarities between the two voyages ended there. "Unlike Fulton we aren't burning anything," said Gathright in a blog post. "The *New Clermont* is rather more unimposing. Instead of spouting fire, the fuel cell units create only pure water—cleaner even than the river we sail upon." Another positive difference, said Gagner: "When Fulton started his steamboat, it didn't work on the first try. We had a much stronger start."

Not only did the *New Clermont* start successfully, it ended up traveling significantly ahead of schedule on the first day of its journey. On the second day, the electric motors failed.

For three long days, the team put their "lives and classes on hold" to figure out how to get the *New Clermont* out of the dock and back on the river. Finally, down to one trolling motor, the *New Clermont* resumed its journey and, 12 days after it launched from Manhattan, inched past the Port of Albany and docked in Troy, propelled the entire way by hydrogen.

Despite the technical delays, word had spread about what the *New Clermont* was trying to accomplish. "We were not just trying to get the word out about hydrogen feasibility," said Gagner. "We were also trying to get across the need to be more conservative and responsible about energy. When things were getting rough, we knew people were watching us, so it made us very averse to giving up."

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Figure 1: The *New Clermont* crew. Seated left to right: Will Gathright, RPI President Shirley Ann Jackson, Natalie Korn, Jennifer Gagner. Standing left to right: Leah Rollhaus, Jason Kumnick, Casey Hoffman.