

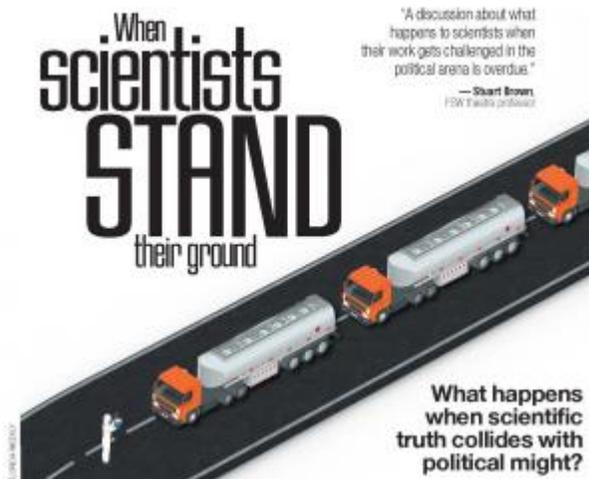
## ◀ When scientists **STAND** their ground

What happens when scientific truth collides with political might?

BY ROGER WILLIAMS

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WHETHER HE KNOWS IT OR NOT, WHEN Marc Edwards whistles out of the southern mountains of Virginia to land at Florida Southwestern State College for a public appearance on Nov. 3, he'll find himself standing in the Sunshine State crossroads of science, politics and that often unruly town crier, art.

Not for the first time, either.

Here, where Florida's water system from Orlando south is now in dire straits — here where political and economic interests often seem to clash with the science that points to an expensive but effective water fix for the vast Everglades ecosystem — he may feel right at home. (For an in-depth look at Florida's water problems and the solutions, see "The Fix," Florida Weekly, Sept. 28.)

Dr. Edwards is a professor of civil engineering at Virginia Tech, where he teaches courses in environmental engineering, applied aquatic chemistry and engineering ethics.



Water expert, engineer and Virginia Tech professor Marc Edwards visits Southwest Florida to discuss the politics of speaking up.

But as reputations go that's the least of it. Doing lab work on corrosion in buildings and "opportunistic premise-plumbing pathogens," he's become one of the most celebrated and coincidentally reviled academic activists in American science.

"I don't feel I've had a choice," he says.

He helped prove, for example, that people were being forced to drink lead-infused water from utility pipes in Washington, D.C. at the beginning of the last decade; he was one of Time magazine's four most important "innovators" in international water issues and dubbed "the plumbing professor" in 2004; a paper on lead poisoning of children in Washington was named outstanding science paper by Environmental Science and Technology, a prestigious trade journal, in 2010; in 2013 he received a premier award for "Courageously defending the public interest at great personal risk;" and this year Fortune and Time both named him one of the most influential people in the world, his biography says.

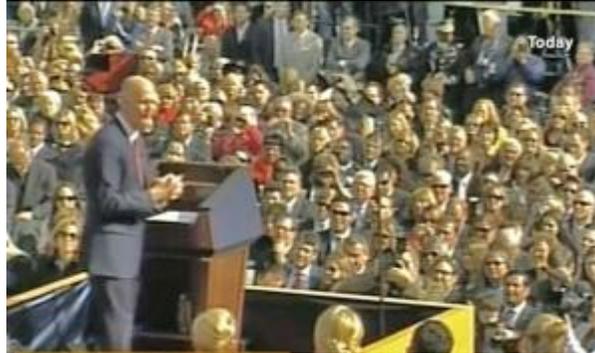


The Flint River used to be the source of drinking water in Flint, Mich. Public officials didn't like it when Dr. Marc Edwards stepped into the public fray in 2014, forcing federal, state and local officials in Michigan to acknowledge actions that poisoned and perhaps killed people drinking from lead-leeching pipes in

the city. LINDA PARTON /  
SHUTTERSTOCK

Dr. Edwards was also a 2007 winner of a MacArthur Foundation “genius grant” (recipients get \$500,000 to do what they want in furthering science or art that might help humanity).

So what could be wrong with that picture?



On January 4, 2011 Rick Scott was sworn in as the 45th governor of Florida. Shortly after he fired more than 200 regulators and officials in the state’s Department of Environmental Protection, and the South Florida Water Management District (among others) backed off regulations designed to protect water. Gov. Scott forbade state employees even to use the term “climate change” in describing what may happen in coastal Florida in the next few decades. C-SPAN

A lot, according to his critics, who include both public officials and some academic colleagues. They didn’t like it when Dr. Edwards stepped back into the public fray in 2014, forcing federal, state and local officials in Michigan to acknowledge actions that poisoned and perhaps killed people drinking from lead-leeching pipes in Flint.

Those officials were also forced to admit they understood the problem long before they acted, an act Dr. Edwards calls “criminal,” and a conclusion drawn by the inspector general of the Environmental Protection Agency, reported Oct. 21 by The New York Times. The EPA could have ordered state and local officials to quit supplying water passing from the Flint River through improperly treated pipes as early as June 2015, but instead waited until January of this year, the inspector general concluded.



Florida Weekly's Sept. 28 issue takes an in-depth look at Florida's water problems with solutions to fix it.

The result in Michigan has been both dismay and huge and ongoing change, but for Dr. Edwards the consequences have been unexpected and disturbing.

"Maybe my academic career is over," he says — in spite of his fame and his tenure as a professor at Virginia Tech. "For me to have to defend myself for exposing an environmental crime ... I am dumbfounded."



"Crabs are pretty hardy but we saw not just a decline in numbers, but death in the crab pots," scientist Melanie Ulrich said. "They crawled in and in several days they were dead. We took pictures because it was kind of disheartening. There's a major problem (in the lower Caloosahatchee south of I-75)." COURTESY PHOTOS

Married and with two children, Dr. Edwards has paid a costly personal price for being a do-good activist, he admits. That's a truth anybody who attends the play "Paragon Springs" at FSW is likely to discover during the public "talk-back" after an opening-night performance on Thursday, Nov. 3, at 8 p.m. in the "Little Black Theater."

Based on the Henrik Ibsen play, “An Enemy of the People,” this 2010 work by Stephen Dietz — to be produced and directed by FSW theatre professor Stuart Brown — describes what happens to a man who discovers the highly profitable tourist waters of a town are toxic and makes the information public.



Scientist crabber Melanie Ulrich on the Caloosahatchee River.

Mr. Brown was born and raised near the Caloosahatchee River, has watched politics ignore science as the quality of the river declined with excessive water releases from Lake Okeechobee, he says, and decided to bring both the play and Dr. Edwards to the region.

“A discussion about what happens to scientists when their work gets challenged in the political arena is overdue,” he explains.

“The first wave of climate scientists was all but obliterated by personal attacks and political pressure and other dirty tricks.,” Mr. Brown says. “Science and politics have antithetical processes and yet, in today’s world, they seem ever more violently thrust into the same space. Should we be doing anything to equip our science majors to confront the bewildering political challenges they may well face in the normal course of their careers?”





WILKINS

That's the troubling but insistent question that art — a painting, a play, a book, a photograph — can raise even if others don't, when politics and science clash, says Mr. Brown.

Dr. Edwards, an incarnate answer to the question, perhaps, appears to have stepped straight from the pages and stages of Ibsen and Dietz, and he knows it.

In his forward to a David L. Lewis book, "Science for Sale," he quotes Ibsen's play:

"Mayor: The matter in question is not a purely scientific one; it is a complex affair; it has both a technical and an economic side ... As a subordinate official, you have no right to express any conviction at odds with that of your superiors.



After Dr. Edwards conducted the tests and in 2014 drawn his conclusions in Flint, once again federal, state and local officials, joined by some academic colleagues around the country, criticized him. They questioned his motives, they questioned his reputation, and they insisted first that he was wrong (he wasn't, as subsequent events show), and second that as a scientist and academic, he should have stayed out of the fray and let others solve the problem.

Thus, so the argument goes, he might remain objective, and government grants to universities and scientists might not be put at risk.

The chill Dr. Edwards feels from both colleagues and officialdom has not lifted, nor has his unequivocal criticism of both civil servant and academic scientists who pass by opportunities to right environmental wrongs, part of the code of engineers and planners all are sworn to, he says — a scientists' version of the Hippocratic oath taken by doctors.

Their view, he argues, is based on a flawed model of proper behavior for good scientists.

"A pinnacle of scientific evolution upheld to my generation was Mr. Spock on Star Trek — half human and without emotion, supposedly full of logic," he explains.

"This is a very dangerous model. My life experiences have shown me that overemphasizing technical knowledge, even at the expense of being human, is very dangerous."

Such danger suggests how important a so-called liberal education — looking into the temperaments, behaviors and experiences of others — might be, he argues.

"While I would not force a liberal education on anyone, we can try to better inspire students to seek one out on their own. I once thought that the humanities were for losers — I had to learn the hard way at age 40 (he is now 52) that was not the case. That to protect innocent kids and fulfill my professional obligations as an engineer, I had to learn about both the worst and best of humankind."

When colleagues criticized him in the journal Environmental Science and Technology, he responded with comments that implied a massive hypocrisy on their parts.

They "teach our students that they must risk their untenured professional careers and risk their livelihood to 'push back when faced with injustice,'" while at the same time arguing that this obligation does not apply to tenured academics because our funding is "too precious to lose."

He then draws this conclusion and repeats it often when he speaks to reporters: "This is the very definition of cowardice."

We are, he says, "the greatest generation of cowards," often too comfortable in our secure lives to do the right thing.

"I think this is about the relationship between science and society, and the trustworthiness of our civil service. The environmental police we pay to protect us — what do we do when they turn



Sunshine State

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For many, perhaps, he describes conditions in Florida, as well as Washington D.C., or Flint.

Here scientists and officials have been fired for questioning or criticizing the state's progress in solving a water crisis. Such purges started before Gov. Rick Scott's administration, says Dr. Catherine Wilkins, an instructor of humanities at the University of South Florida's Honors College in Tampa who teaches "Florida: A Cultural History of Place."

"Lou Toth, the chief scientist on the restoration of the Kissimmee River, and his organizer Paul Whalen were both fired for making comments about the slow pace of change," she recalls.

When Gov. Scott arrived in Tallahassee he fired more than 200 regulators and officials in the state's Department of Environmental Protection, and the South Florida Water Management District (among others) backed off regulations designed to protect water quality. Scott forbade state employees even to use the term "climate change" in describing what will happen in coastal Florida in the next few decades.

When state DEP lawyer Chris Byrd became vocal about climate change in 2013, he was fired, Dr. Wilkins says.

When University of Florida scientists at the Water Institute produced a lengthy 2014 study pointing the way to restoration of the Everglades system from Orlando south, lobbyists and representatives of conflicting economic interests — those ranging from officials for sugar companies or corporate farm operations to environmental groups — seized on the report to show either why they should not have to be part of the fix, or why some groups should, says Dr. Wendy Graham, director of the UF Water Institute.

But she and Dr. Thomas Frazer, acting director of the Water Institute this year (Dr. Graham is on sabbatical), stuck to their science guns, no matter which politician or what group might have preferred otherwise.

"Our report said, 'This is a big problem with hydrologic, legal, infrastructure complaints,'" she noted. "There is no silver bullet that will solve the problem. We'll need (water) storage north, south, east and west of (Lake Okeechobee) and maybe more in the lake to make it work.

"None of the projects taken one at a time can solve the problem. Individually they don't show benefit across the system. It will take all the projects to achieve restoration goals for the estuaries, the lake and the Everglades."

But politicians and lobbyists left the scientists alone, too, says Dr. Frazer. Asked if anyone criticized him or the Water Institute for the findings or tried to sway what the study might report, he replied, "That's an easy one to answer. The answer is 'No.'"

Such experience in Florida has not been a given.

Dr. Brian LaPointe, a marine biologist and researcher at the Harbor Branch Oceanographic Institute, part of Florida Atlantic University, says for years nobody wanted to hear about his research into the pollution cause by septic tanks both on Florida's west coast in the

For Dr. Melanie Ulrich, a microbiologist and professor at FSW who with her husband also owns and operates a commercial fishing vessel seeking blue crabs in the Caloosahatchee River, public reaction to her discovery that blues crabs were dying suddenly in huge numbers in the lower reaches of the river earlier this year was surprisingly hostile.

As a crabber, she reports size and quantity of catches to the Florida Fish and Wildlife Commission. But as a scientist she also began to study the locations of the dead crabs, ultimately getting a grant to let her students participate and do the science.

“Crabs are pretty hardy but we saw not just a decline in numbers, but death in the crab pots. They crawled in and in several days they were dead. We took pictures because it was kind of disheartening. There’s a major problem (in the lower Caloosahatchee south of I-75).”

She and her students are now studying the problem in greater depth, but it takes time. “You can’t assume that the ecosystem will balance it out, and it will be okay.”

And you can’t assume that people will embrace the science and its results. When her observations were reported in the daily newspaper, some people reacted with hostility, inviting the Ulrichs to pick up and go back to Maryland where they’d come from in 2012, she recalls.

“In 2014 there was still profit and reasonable crabbing in this,” she says. “But then we see a 58 percent reduction in blue crabs. There’s runoff from fertilizers, nitrate imbalances and so on, but from crab perspective, it’s probably the salinity.

“The reality of the science is, you want to watch this over multiple years, but you don’t want to wait until you say, ‘We’ve looked at it for a decade — there’s a problem.’ So you have to act.”

You have to act.

Or you can remain a coward, in the view of Dr. Edwards, loyal to your appointments, your grants, your political masters.

But there are other ways to be courageous, suggests Dr. Wilkins.

“I believe Marc Edwards embodies a particular type of heroism that is necessary, but there are ways other people who may not have the sorts of advantages or positions of power that he had when he began this, can act.

“It takes leaders like Dr. Edwards, but additionally it takes consensus and movement in society.

“And people demonstrate courage or become activists in smaller ways: maybe they boycott a product, say sugar, or cast a ballot based on principle, or have an important conversation with a family member, or as a teacher simply pass to students a value that encourages them to question authority.”

Or they can discover a great play, find the hero who seems to walk out of its pages from the past



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What: “Paragon Springs,” by Stephen Dietz

>> When: Nov. 3-5, Nov. 10-12, 8 p.m. (Saturdays at 2 p.m. and 8 p.m.)

>> Where: Black Box Theatre, Florida Southwestern State College, corner Summerlin Road and Cypress Lake Drive, Fort Myers

>> Special Guest: Dr. Marc Edwards in a public “talk-back,” Nov. 3, starting at 8 p.m.

>> Tickets: [www.brownpapertickets.com](http://www.brownpapertickets.com)

>> Also: Nov. 2, 3 p.m. in Rush Auditorium, Bldg. J, Rm. 103, to talk about his experience in exposing lead-toxic tap water in Washington DC and Flint.

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