TURNING POINT
John Dabiri

A. SUMMA/MACARTHUR FOUNDATION

John Dabiri, a biophysicist at the California Institute of Technology (Caltech) in Pasadena, was named a MacArthur Fellow last September for his work on the hydrodynamics of jellyfish swimming. The award brings a US$500,000 research grant over five years.

What does this fellowship mean to you?
I don't get a lot of external feedback, because my field is small, and the award signals that at least some people out there appreciate my work. I hope it will encourage others to do unconventional research.

What are some applications of your findings?
The flow dynamics of jellyfish propulsion are similar to cardiac blood flow. In the heart, oxygenated blood enters the left ventricle and forms a vortex; that structure is important for efficient heart function. My colleague Mory Gharib, a bioengineer at Caltech, suggested looking at cardiac blood flow as an index for heart failure. Essentially, you would measure that vortex and determine whether the heart was approaching dysfunction — ideally, earlier than is possible now. We can use jellyfish hydrodynamics to model the heart.

What are you working on at the moment?
I'm making a foray into wind energy. Most wind turbines rotate on a horizontal axis, but I'm researching vertical-axis turbines. Conventional turbines can accept wind from only one direction, but these can take it from anywhere. The only problem is that they convert less wind into energy. But the total energy output of a group of vertical-axis turbines can be superior to the status quo.

Is this linked with your jellyfish work?
It's related more generally to fish swimming. We had done some modelling to work out how to arrange vertical-axis turbines for greatest efficiency, and it occurred to me that we could gain information from how fish swim. When fish arrange themselves in schools, they can interact with vortices created by the fish next to them. The question is, do certain arrangements minimize energy expenditure, and are ten fish more efficient on average than one? As my team and I set up our wind farm, we applied our knowledge of flow dynamics and fish schools to maximize the energy that turbines take out of the air.

How is this project progressing?
Last September we received a grant from the Gordon and Betty Moore Foundation in Palo Alto, California, to buy a parcel of land and create a research wind farm with 42 9-metre-tall wind turbines. This is an excellent opportunity to test our modelling and prove our ideas in the real world — we don't have to rely on a wind tunnel or computer simulations.

What advice do you give to new junior faculty members?
Academia can be a roller coaster of good and bad news. The same year that the US National Science Foundation rejected my grant application for the third and final time, the work that they had turned down was published on the cover of *Nature*. And a week after winning the MacArthur fellowship, I had a paper related to the relevant work rejected by another journal. Don't let praise or criticism get to you — it's a weakness to get caught up in either one.

What achievement are you most proud of?
In my field there are few black researchers, so having the opportunity to work and teach at Caltech and to demonstrate the promise of under-represented groups is exciting for me. I hope that I can inspire young students in the African American community and help them to realize that they have options.

Do you have a secret for scientific success?
I work hard and pray a lot, and I keep in mind that at the end of the day, there's a lot that's out of my control. You can't control the reviewer who isn't going to like your study, or whether your great idea will get scooped by another lab. But you can control whether you show up and put in the effort. ■

INTERVIEW BY KAREN KAPLAN

GRADUATE STUDENTS

US applications rise

Overseas applications to US graduate institutions increased by 9% in 2010–11, says a report released on 9 April by the US Council of Graduate Schools (CGS) in Washington DC. The *2011 CGS International Graduate Admissions Survey* indicated that applications from China were up by 18% and those from the Middle East and Turkey rose by 12%, marking the sixth year in a row with double-digit increases from all three regions. Applications from India and South Korea rose by 7% and 2% respectively, following large declines in 2008–09. All fields of study showed growth in 2010–11, led by 12% increases in overseas applications to physical and Earth sciences and engineering. Life-sciences applications rose by 8%, the field's largest gain since 2007.

UNITED KINGDOM

Postdocs need support

UK postdoctoral researchers need better career advice, finds a survey of 776 postdocs by the Royal Society of Chemistry and the Institute of Physics, both in London. *Mapping the Future: Physics and Chemistry Postdoctoral Researchers' Experiences and Career Intentions*, released on 14 April, says that less than half have regular appraisals, and impartial advice about non-academic careers is scarce. Female chemists were most likely to have doubts about staying in academia, and male physicists spent the most time as postdocs: an average of 3–4 years, compared with 1–2 years for women. The problems should be tackled by universities, funding bodies and the Concordat Strategy Group, a UK postdoc-support organization, says the report.

CANCER THERAPEUTICS

Massachusetts openings

Blueprint Medicines, a start-up cancer-therapeutics company based in Cambridge, Massachusetts, is to recruit up to 20 researchers. In April, the firm secured US$40 million in venture capital, the largest first-round financing deal in 2011 so far for a life-sciences company, says the US National Venture Capital Association in Arlington, Virginia. Chris Varma, co-founder of Blueprint, says that the start-up is seeking early-career and established medicinal chemists, cell and structural biologists, and bioinformaticians to help discover genomics-based therapies.