



BIODESIGN BRIEFS

Claudia Acquisti, PhD, Center for Evolutionary Functional Genomics, published a new perspective on environmental nutrient availability and the evolution of life in the Jan. 4 edition of the journal *Nature*.

ASU will receive \$1.85 million from the Science Foundation Arizona as part of the foundation's \$4 million graduate student fellowship.

On a 2,800-mile bicycle ride to raise awareness about Friedreich's ataxia, **Kyle Bryant**, who has the rare neuromuscular disorder, made a stop Jan. 31 at the institute, which recently launched a research center to fight such diseases caused by defects in the cells' mitochondria.

Don Gervasio, PhD, Center for Applied NanoBioscience, was awarded a \$1.5 million grant by the Department of Energy to develop new fuel cell components to more efficiently generate electrical power.

Michael Rosenberg, PhD, Center for Evolutionary Functional Genomics, was awarded \$643,000 by the National Science Foundation to develop a software package called PASSaGE, which is designed to analyze data with spatial characteristics.

Jieping Ye, PhD, Center for Evolutionary Functional Genomics, was awarded \$584,000 by the National Science Foundation to develop a computer framework using a technique called machine learning for analyzing biological images.

Guy Cardineau, PhD, Center for Infectious Diseases and Vaccinology, was appointed to the USDA Advisory Committee on Biotechnology and 21st Century Agriculture.

Congratulations to **Lance Stern**, who won the Velocity readership survey iPod drawing. Stern was randomly selected to win an iPod nano from among our survey participants. Thanks to all the readers who provided feedback.



CLAUDIA ACQUISTI



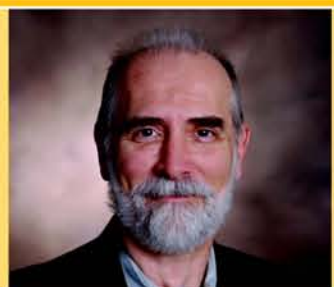
KYLE BRYANT



DON GERVASIO



MICHAEL ROSENBERG



GUY CARDINEAU

WANT MORE BIODESIGN NEWS?

Monthly updates from the Biodesign Institute at ASU can be sent directly to your inbox by signing up for our free monthly e-newsletter. Register at www.biodesign.asu.edu/news/monthly.

CONTACT US

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NIH FUNDS NEXT GENERATION OF DNA SEQUENCING PROJECTS

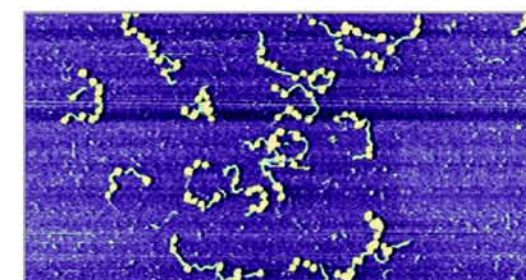
DNA testing is transforming health care and medicine, but current technologies only give a snapshot of an individual's genetic makeup. Any patient wanting a complete picture of their inherited DNA, or genome, would likely faint at the sight of the bill, which currently would total \$10 million or more.

Now, with an \$897,000 grant award from the National Human Genome Research Institute, chemist Peiming Zhang, PhD, and collaborator Jian Gu, PhD, at the Biodesign Institute at Arizona State University are expanding efforts to dramatically lower the cost of DNA sequencing.

The NHGRI, part of the National Institutes of Health, has set an ambitious target of \$1,000 or less — a cost 10,000

times lower than current technology — to make genome sequencing a routine diagnostic tool in medical care.

"Nanotechnology allows us to pioneer a new approach to sequencing," said Zhang, associate research professor in the institute's Center for Single Molecule Biophysics.



Quicker, cheaper DNA sequencing may mean genetic research develops a more significant role in everyday medical practice.

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BIODESIGN

Velocity

Quarterly news from the Biodesign Institute at Arizona State University

THE biodesign INSTITUTE

ARIZONA STATE UNIVERSITY

TEAM PURSUES CANCER VACCINE

Mayo Clinic joins Biodesign Institute in ambitious project

Researchers at the Biodesign Institute and Mayo Clinic are teaming to tackle one of the most ambitious projects in medicine: creating a vaccine to prevent the development of cancer. The project takes an unconventional approach, but one backed by promising new science.

At the root of most cancers is a single cell going awry and dividing uncontrollably, producing a tumor. The difficulty in making a cancer vaccine is that every tumor is slightly different. However, research led by Stephen A. Johnston, PhD, who directs the institute's Center for Innovations in Medicine, now suggests there may be common themes in the protein signatures that tumors produce.

"This idea of identifying signatures unique to cancer suggests the possibility of preventive vaccines," said Laurence Miller, MD, director of research and deputy director of the Mayo Clinic Cancer Center. He noted that the recent success of

the human papilloma virus vaccine to prevent cervical cancer supports this concept.

Mayo Clinic and ASU have invested seed funds to launch the project and begin gathering data and will

be seeking philanthropic support to advance the project. Johnston anticipates that the team will know if this is a viable approach within the next three years.

Yvette Ruiz and Douglas Lake discuss their latest efforts to uncover cancer protein signatures as part of the Biodesign and Mayo cancer vaccine project.





OPINION: SUCCESS RELIES ON PARTNERSHIPS

One of the biggest challenges in research is avoiding “me too” science. Progress can be made by building upon the work of others or blazing a new trail, but not by following in others’ footsteps.

Avoiding duplication can be difficult, however. Science is a vast, international enterprise, and the historic focus on individual achievement and specialization has promoted isolation.

By contrast, the translational research of the future depends on the collaboration of academic, commercial, clinical and governmental entities. Arizona is fast proving to be a place where such collaboration can flourish.

This issue of *Velocity* highlights several exciting local partnerships that demonstrate how our state is not only building on its strengths, but is doing some trailblazing as well.

Michael Tracy, DPhil
Deputy Director

FUNDS SPUR NEW BIODESIGN, BIO5 COLLABORATIVE PROJECTS

The Arizona Board of Regents approved the allocation of \$2 million in funds, through the use of the voter-approved sales tax increase that created the Technology Research Infrastructure Fund, to promote cross-disciplinary research projects between Arizona State University and the University of Arizona. Researchers at ASU’s Biodesign Institute and UA’s BIO5 Institute will receive nearly \$1.2 million for four of 10 funded research projects.

“The strategic partnerships established between Biodesign and BIO5 will leverage our citizens’ investment in the significant

expansion of university research capacity to improve the quality of life,” said George Poste, director of the Biodesign Institute.

The institutes will focus on developing novel molecular therapeutics and diagnostics to improve the health of individuals suffering from diabetes, asthma, and valley fever and also to enhance drug discovery efforts.

The awards provide seed money so researchers can demonstrate proof of concept for their projects, which increases their ability to secure and leverage further external funding from federal agencies and industry.

Elizabeth Lambert and Mitch Magee are embarking on a molecular diagnostic project to improve the health of individuals suffering from valley fever in a Biodesign/BIO5 collaboration.



BIODESIGN TO DEVELOP NEW NERVE AGENT ANTIDOTES

As part of a \$14.4 million National Institutes of Health initiative to combat chemical threats, Tsafir Mor, PhD, researcher in the Biodesign Institute’s Center for Infectious Diseases and Vaccinology, has been awarded a new five-year, \$2.67 million grant to develop improved nerve agent antidotes.

Nerve agents, such as sarin, are among the most lethal chemical weapons. They were used by a terrorist organization in the subway attacks in Japan in the mid-1990s and in wars as recently as the 1980s.

Mor’s project is focused on designing human enzymes to neutralize nerve agents and on utilizing plants to express proteins of human origin in high quantities.

“We can use plants and new technologies developed at ASU to scale-up production to make large amounts of antidote material in a cost-effective manner,” said Mor.



Tsafir Mor and Ryan Woods are using tobacco plants as factories to make new nerve agent antidotes.

NEW RESEARCH TEAMS AT THE INSTITUTE



Marc Porter, Director
Center for Combinatorial Sciences

The center is optimizing new micro- and nanoscale materials to create new medical diagnostics and sensors.



Deirdre Meldrum, Director
Center for Ecogenomics

The center is developing technologies that enable the study of live organisms in harsh environments.



Randall Nelson, Director
Molecular Biosignatures Analysis Unit

The unit is researching protein differences between healthy and ill individuals.

BIODESIGN SCHOLAR SEEKS TO REDUCE THE EFFECTS OF AGING

Doctoral student John Schloendorn seeks to defy the human body’s predetermined course to deteriorate.

“It is unacceptable that our bodies fall apart before we are done with them,” said Schloendorn, a native of Munich, Germany and an inaugural Biodesign Institute Graduate Research Scholar.

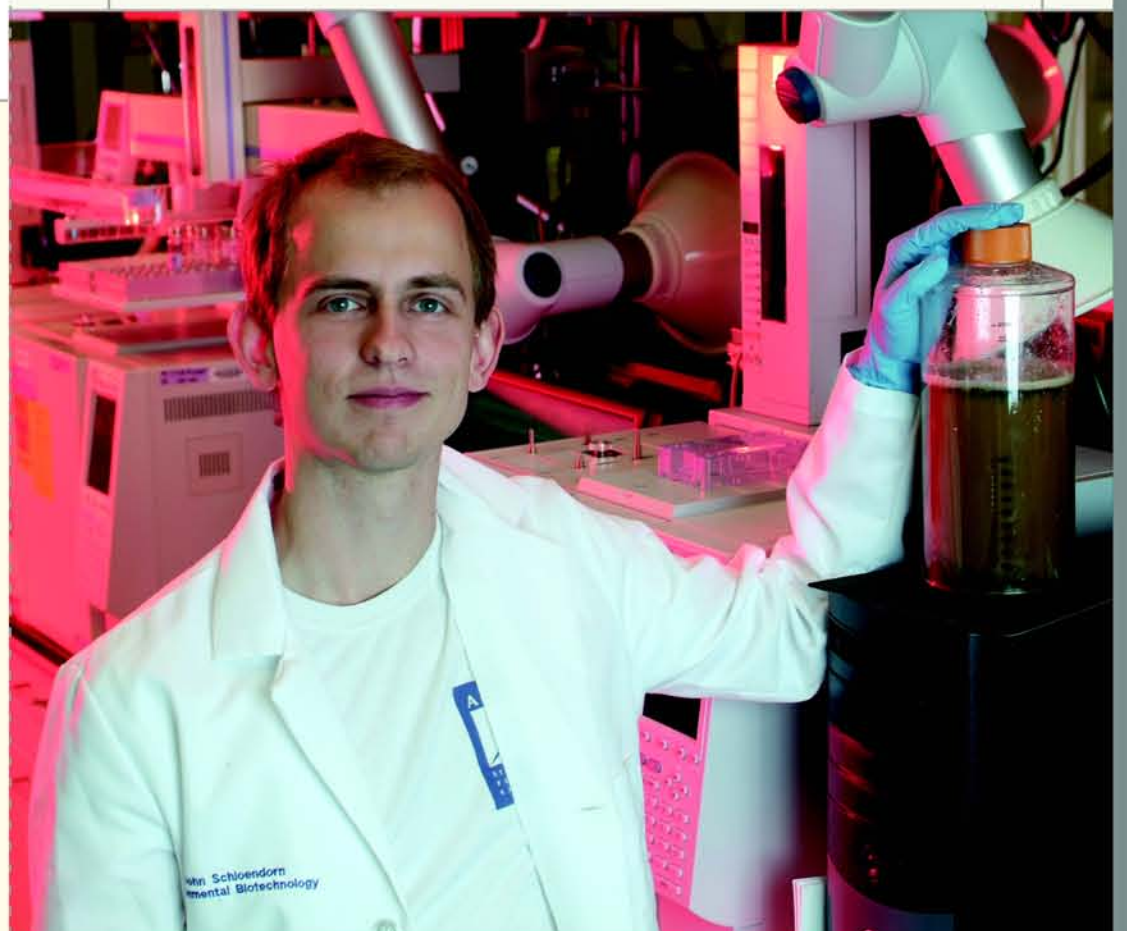
Schloendorn is identifying genes that allow microbes to produce enzymes to biodegrade molecular “junk” that accumulates inside cells, such as cholesterol in the arteries. This junk is at the root of many types of debility caused by aging. Ultimately, he aims to replicate

the enzyme and use it as a type of enzyme replacement therapy.

In November 2005, Schloendorn started research in the Biodesign Institute with underwriting from the Methuselah Foundation, an organization dedicated to science-based therapies to combat aging.

Schloendorn is working under the direction of Bruce Rittmann, PhD, who directs the Center for Environmental Biotechnology. The match is advantageous, as Schloendorn applies microbial biotechnology to human health similar to what Rittmann uses to clean the environment.

John Schloendorn examines soil samples in search of microbes that eat molecular junk.



INAUGURAL CLASS OF GRADUATE RESEARCH SCHOLARS UNDER WAY

The Biodesign Institute has selected its inaugural class of Graduate Research Scholars. The research scholars program awards outstanding ASU doctoral students \$30,000 per year and prepares them to work in a team-oriented, highly fused interdisciplinary research setting.

Traditional graduate science education has been focused on a “one-lab, one-discipline, one-mentor” experience in producing the next generation of research scholars. The Biodesign Institute’s broad educational vision, from high school internships to undergraduate opportunities to training for PhD candidates and postdoctoral research scholars, is to break down these traditional boundaries between disciplines to provide a dynamic, customized research experience.

Graduate Research Scholars for 2006-2007 include, from left: Kausar Nadim (biochemistry), John Schloendorn (biochemistry), Gabriel Bodeen (biomedical engineering), Lijing Jiang (biology), Sarah Kessans (plant biology), and Rebecca Halperin (biology and decision science).