U.S. Constitution provides framework for debate on genetic engineering of humans

Jane Sanders

Research News

The U.S. Constitution may not provide direct answers to policy questions about the genetic engineering of human beings, but it does offer shared values that can help frame the debate about this developing technology, according to a Georgia Tech professor.

“One of the chief difficulties in understanding and addressing the policy and ethical issues surrounding genetic engineering of humans is the novelty of this technology,” said Roberta Berry, an associate professor in the School of Public Policy. “We’ve never before had the opportunity to revise our biological constitution in this way. So it’s difficult to find a framework for addressing this.”

But the U.S. Constitution provides a set of values, or foundational norms, such as the promotion of welfare, science and the useful arts, the protection of liberty and equal protection, that are part of Americas’ shared political heritage, Berry noted.

Disagreement often arises about how to understand and apply these norms in certain cases — embryonic stem cell research, for example — and debate ensues.

Berry discussed her ideas earlier this month, in a presentation at the annual meeting of the American Association for the Advancement of Science in Washington, D.C., during a session titled “Beginning and End-of-Life Technologies and Core Constitutional Values.”

A widening conversation

Though genetic engineering of human beings may seem the stuff of science fiction, researchers have already created human artificial chromosomes to produce transgenic animals and to administer gene therapy to living humans. Nevertheless, the public policy debate about genetic engineering in humans is likely to intensify over the next 10 years, Berry predicted, expanding from familiar public policy questions of medical risk and benefit to enter the realm of novelty.

“We will face the fact that defining the benefits of this technology is value-laden,” Berry said. “It won’t be a simple matter to say, ‘it’s better to be taller rather than shorter’ or ‘it’s better to have a strong memory than to be forgetful.’ People will disagree about the relative importance of features and the deeper questions on human relationships — how we treat each other.

“Should we devote ourselves to conscious efforts to design people according to a superior set of criteria? What is a superior human being? We’ll draw upon all sorts of past experience with eugenics, people with disabilities and various affiliations.”

It is then she hopes that the public policy debate will center on constitutional norms.

“Genetic engineering of humans raises questions about general welfare, procreative liberty, the advancement of science and the useful arts, and when it’s for our benefit and when it’s no longer a benefit because it violates other values we hold dear,” Berry said. 

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College of Architecture undergraduate Keith Dunbar participates in a college basketball video game tournament, sponsored by EA Sports, at the Campus Recreation Center. The game design company visited campus last week to film students and fans during the Georgia Tech-Duke basketball game, footage it will use in commercials and future editions of its “March Madness” video game.

Professor: science partnerships can play a key role in U.-Arab relations

David Terras

Institute Communications and Public Affairs

At the largest general scientific conference in the world, a Georgia Tech faculty member argued that research partnerships in science and technology are a crucial part of American efforts to build alliances with Arab nations and should receive increased financial support from the United States and oil-rich Arab governments. Regents Professor Mostafa El-Sayed presented his case at the annual meeting of the American Association for the Advancement of Science (AAAS) in Washington, D.C., earlier this month.

“There is a lot of misunderstanding between the United States and Arab countries, based on differences in religion and ideology, but science is a language we all speak, and the advances it brings can help fuel the economies of countries like Egypt, Jordan and Lebanon, which don’t have the tremendous oil wealth that some of the other Arab countries have,” explained El-Sayed, who also directs the Laser Dynamics Laboratory in the School of Chemistry and Biochemistry.

Likening the partnerships to a scientific version of the Peace Corps, El-Sayed reasoned that while this investment will not single-handedly reduce anti-American sentiment in the so-called “Arab street,” the working partnerships it forms can help to foster an atmosphere of international trust and understanding throughout academia, which can have a trickle-down effect in other parts of society.

“We will never make them rich off these partnerships alone,” explained El-Sayed. “But the level of communication that is necessary for a successful research partnership is a step towards getting people in Egypt and
Study: companies should give online consumers more privacy

Brad Dixon
College of Management

To quell the privacy-invasion fears that are stunting the growth of e-commerce, Web marketers need to give consumers more control over the personal information collected about them, according to research by Naresh Malhotra, Regents' professor of marketing in the College of Management.

"Despite the enormous potential of e-commerce, its share of the total retail sales is less than 1 percent worldwide," says Malhotra, leader researcher of a study recently published in the Journal Information Systems Research. He cites a recent report showing that 94.5 percent of Americans worry about abuse of their personal information when they shop online.

Malhotra's study, which surveyed 742 households in one-on-one interviews, found that online consumers want to be aware of and have direct control over their personal information that is stored in marketers' databases. "Consumers should be able to add, delete or modify at will any of their personal information," Malhotra says. "At the very least, companies should make sure their consumers can easily verify their information and know how it is being used."

Online marketers want as much personal information as possible in order to provide individualized service to customers, including details about shopping behavior, lifestyles and finances, he explains. For instance, airlines can e-mail people customized fare offers if they know their destination preferences.

"This mass customization increases the efficiency of marketing and the value that customers can derive as long as marketers don't misuse the personal information collected," Malhotra says.

Many e-commerce firms retain the right to sell personal information to outside parties unless consumers specifically opt out. "Information should only be obtained from consumers in ways that don't violate any ethical or legal norms," Malhotra says. "Obtaining information without consent isn't appropriate. Consumers are more willing to provide information voluntarily if online companies can engender a sense of trust, the study found. One way to do this is through the use of increasingly popular third-party "seal of approval" programs, such as the Better Business Bureau's BBBOnline, he says. Online vendors who want to participate in these programs must follow a set of standards concerning privacy and security.

In addition to examining the control and trust issues of online consumers, Malhotra's study established a new scale for researchers to use in measuring the depth of Internet users' information privacy concerns.

Communications groups receive peer recognition at regional conference

Georgia Tech communications groups won six awards in the 2005 Council for the Advancement and Support of Education (CASE) District III recognition program, held last week in downtown Atlanta. Half of the awards, which were announced at the organization's annual meeting in Atlanta, were for photography.

• For the second consecutive year, the Research News and Publications Office won the "grand award" in the "Media Relations Programs" category.
• An "award of excellence" was given to the Georgia Tech Alumni Association in the "Photo Essay and Series" category for a photo series shot by Georgia Tech alumnus William "Bill" Goodiew III titled "Images of Adventure."
• An "award of excellence" was given to the Research News and Publications Office for the Research Horizons magazine, Georgia Tech's official research magazine.
• A "special merit award" was given to the Georgia Tech Alumni Association for Tech Topics, the quarterly tabloid publication for alumni.
• A "special merit award" was given to Institute Communications and Public Affairs for the online photo galleries the department provides to the campus Web site.
• A "special merit award" was given to the Research News and Publications Office for a photo shot by freelancer Gary Meeks of the "All-in-One" dental tool being developed in the Georgia Tech Research Institute.

CASE is the professional organization for professionals who work in alumni relations, communications and development for more than 5,000 colleges and universities nationwide. District III represents nine states in the Southeast. 
Imaging technique to help improve bone grafts

Megan McKainey
Institute Communications and Public Affairs

Tissue engineers can choose from a wide range of living cells, biomaterials and proteins to repair a bone defect. But finding the optimum combination requires improved methods for tracking the healing process.

New Georgia Tech research points to better ways to heal and regenerate bones using micro-computed tomography (micro-CT) imaging — a process 1 million times more detailed than a traditional CT scan. The new technique simultaneously looks at both vascularization (the process by which blood vessels invade body tissues during repair) and mineralization (the process by which mineral crystals form to harden regenerating bone) by collecting three-dimensional (3-D) images in vitro and in vivo.

Researchers used the new technique to help develop bone graft substitutes that combine the availability and structural integrity of bone allografts — bone grafts taken from a human donor — with the better healing properties of bone autografts, or bone grafts taken from the patient. Unlike a traditional X-ray that only shows the presence of bone in two dimensions, the new micro-CT technique provides high-resolution 3-D images of vascularization and mineralization during bone repair. Although not yet available clinically, these techniques give researchers an unprecedented depth of data on how a bone implant behaves when regenerating into the body.

The project is headed by Robert Guldberg, a research director at the Georgia Tech/Emory Center for the Engineering of Living Tissues and an associate professor in the School of Mechanical Engineering.

“We’re applying 3-D imaging techniques to quantify vascularization and mineralization in order to evaluate which of these tissue engineering approaches is going to be able to best and most quickly restore bone function,” Guldberg said. “We’ve always known that vascularization is very important to bone repair, but we’ve never really had a good method to measure the process.”

Guldberg’s team has used micro-CT imaging to study fracture healing and repair of large bone defects that result from the removal of bone tumors or crushing injuries. Large bone defects are typically repaired with allografts because large structural pieces are available from human donors. But allografts are processed to avoid transmitting any diseases from the donor to the patient, leaving the bone sterile but dead. Allografts therefore lack living cells that could help the implants better integrate with existing bone. Consequently, they don’t heal as well as autografts, and can break again in 30 percent of patients within a year.

Autograft bone integrates much better, but large amounts of bone are needed to repair a site. They are often too large to remove elsewhere in the patient’s body and cause substantial additional pain.

Georgia Tech’s micro-CT imaging facility has been used to study tissue engineering approaches to enhance or replace the use of bone grafts clinically. Guldberg and his collaborators, for example, have explored various strategies to revitalize dead allograft bone. Wrapping allografts with biomaterials containing living marrow cells, or delivering bioactive genes has resulted in significantly accelerated repair and integration of allograft implants.

In addition to studying bone regeneration, the ability to look at detailed 3-D images of vascular networks can shed light on research into vascular injuries, disc degeneration in the back, and help pinpoint areas of increased vascularization, which often indicate tumor growth.
Arts & Culture

Mar. 3
The School of Literature, Communication and Culture’s Poetry at Tech series continues as Professor Thomas Lux introduces C.K. Williams and Adam Zagajewski, at 7 p.m. in the LeCraw Auditorium. For more information, visit www.iac.gatech.edu/poetry.html.

Mar. 9
The Ferst Center for the Arts welcomes the Mozart Festival Opera for an 8 p.m. performance of “The Marriage of Figaro.” For tickets, call 894-9600.

Mar. 11-12
The Ferst Center welcomes Cicque Eloi for two 8 p.m. performances of its “Rain” program. For tickets, call 894-9600.

Brown Bags/Conferences/Lectures

Mar. 2
In cooperation with the Georgia Electronic Design Center, the Center for Research on Embedded Systems and Technology welcomes Ivio Bolsens, chief technology officer for Xilinx, on “A New Era in FPGA Design,” at 11 a.m. in the TSBR Auditorium. For more information, e-mail mooney@ece.gatech.edu.

Mar. 9
The School of Psychology’s spring colloquium series welcomes Jeffrey Schall, professor of neuroscience at Vanderbilt University, on “Neural Selection and Control of Visual Guided Eye Movements,” at 3 p.m. in the J.S. Coon Building.

Mar. 10
The Architecture Program welcomes Mahadev Raman, principal and building sector leader for Ove Arup and Partners Consulting Engineering, on “An American Perspective on Sustainability,” at 5 p.m. in the College of Architecture auditorium.

Mar. 10
The School of Mechanical Engineering’s Woodruff Colloquium series features Gareth McKinley, director of the Hatsopoulos Microfluids Laboratory at MIT, on “Elasto-Capillary Thinning and the Breakup of Complex Fluids,” at 11 a.m. in the MARC Auditorium.

Mar. 11
The Program in Cognitive Science Colloquium features David Parish, professor of cognitive science at the University of California at San Diego, on “Routines, Cost Structure and the Design of Environments,” at noon in room 114, MARC.

Faculty/Staff Development

Mar. 3
The Office of Information Technology gives an overview of Georgia Tech’s information security benefits, from 1:30 - 4:30 p.m. in room 117, OIT Building. To register, visit www.trainsweb.gatech.edu/mastcal.asp.

Mar. 9
The Office of Sponsored Programs offers a brown bag session on Facilities and Administrative (F&A) costs with Associate Vice Provost for Research Jilda Gaston and Director of Grants and Contracts Accounting Chuck Duffey, in the seminar room of the Research Administration Building. To reserve a seat, call 894-6944.

Mar. 18
The Center for the Enhancement of Teaching and Learning’s faculty development seminar series presents “Mindmapping the Classroom,” from 11 a.m. - 1 p.m. in the Library’s Wilby Room. For more information, visit www.cettl.gatech.edu.

Miscellaneous

Mar. 9
The Office of Human Resources hosts a pre-retirement meeting on Social Security and Georgia Tech benefits, from 1:30 - 4:30 p.m. in room 117, Student Services Building. For more information, visit www.ohr.gatech.edu. To register, visit www.trainsweb.gatech.edu/mastcal.asp.

Mar. 21-25
Spring break.

E-mail events to editor@icpa.gatech.edu. Submissions within two weeks of the scheduled date will be listed as space allows.