

# NABC

## news

Fall 2006 No. 33

*Providing an open forum  
for exploring issues in  
agricultural biotechnology*



### NABC'S PRINCIPAL OBJECTIVES ARE TO:

- provide an open forum for persons with different interests and concerns to come together to speak, to listen, to learn, and to participate in meaningful dialogue and evaluation of the potential impacts of agricultural biotechnology
- define issues and public policy options related to biotechnology in the food, agricultural, biobased industrial product, and environmental areas
- promote increased understanding of the scientific, economic, legislative, and social issues associated with agricultural biotechnology by compiling and disseminating information to interested people
- facilitate active communication among researchers, administrators, policymakers, practitioners, and other concerned people to insure that all viewpoints contribute to the safe efficacious and equitable development of biotechnology for the benefit of society
- sponsor meetings and workshops and publish and distribute reports that provide a foundation for addressing issues.

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## Letter from the Chair....

“May you live in interesting times.” This phrase is often referred to as a Chinese curse since “interesting” is purported to mean dangerous or turbulent. But the truth of the matter is much more complex, according to Dr. Ho Yong. In response to a question during the PBS show *Newshour with Jim Lehrer*, Dr. Yong wrote a detailed explanation of the phrase (<http://www.chinasprout.com/html/column15.html>). Most importantly, he explained that it is not of Chinese origin, but probably has its roots in America. The phrase commonly occurs in book prefaces, newspapers and speeches, lending Confucian-like wisdom. But what does it really mean? Is it a curse or just a way of wishing that someone will live in times of intellectual challenge rather than of boredom?

We live in the age of biotechnology and it is a most interesting time! There has been a long road to this point and an even longer road stretches ahead, paved by scientists of diverse disciplines. That road has not always been straight or smooth. When NABC was formed in 1988, there was little controversy about agricultural biotechnology. Sure, some media had followed the 1983 proposal by Steve Lindow and his UC Berkeley colleagues to field-test a genetically altered (“ice-minus”) bacterium, sprayed onto plants to reduce the risk of freezing, a proposal that was delayed for 4 years through a series of legal challenges. Genetically engineered products, introduced into food in 1990—a GM yeast for baking and chymosin from a GM microorganism replaced calf-stomach rennet in cheese-making—were not widely publicized and elicited little public reaction. Times have changed and become, shall we say, more interesting.



TONY SHELTON  
NABC CHAIR 2006-2007

The August 11 daily update from AgBioView ([agbioworld@yahoo.com](mailto:agbioworld@yahoo.com)) included an article by Terry Wanzek who grows corn, soybeans and wheat on his family farm in North Dakota and is a former state legislator. He makes some strong points about the recent trend in legislation at the state or local level, especially a Santa Cruz County initiative in which the local legislature, without full community discussion, placed a moratorium on growing biotech crops. Mr. Wanzek considers that “success” of the anti-biotech movement an exception to the general trend, rather than a call to action for other municipalities and states. He states: “The anti-biotech backlash they’ve been working and hoping for simply hasn’t materialized in the United States. In fact, it has fizzled. Aside from a few exceedingly minor successes in places such as Santa Cruz County, where farming is not a major economic presence, it has been a dud.” Mr. Wanzek continues by describing a recent Pew report: “Last year, lawmakers introduced 117 pieces of proposed legislation related to agricultural biotechnology in thirty-three states plus the District

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## NABC 19—Mark Your Calendar

### *Agricultural Biofuels: Technology, Sustainability, and Profitability*

South Dakota State University, Brookings, SD, May 22–24, 2007

John Kirby

“Large scale agriculture is in a period of transition, a paradigm shift, from the production of food, feed and fiber, to the production of food, feed, fiber and fuel” (G. Carlson, SDSU). This transition is being driven primarily by high costs of petroleum and availability of starch (corn) and oil (soybean) for the production of ethanol and biodiesel, respectively. The initial targets for biofuel replacement of petroleum-based fuels range from 10% to 25% of the current ~140 billion gallons of gasoline used for transportation per year. Due to limited availability of corn starch and relative inefficiency of starch conversion to ethanol, additional sources of feedstock need to be developed to meet biofuel-production targets; it is expected that technologies that convert cellulose to ethanol or other fuel types will be required. Additionally, the conversion of ~5 billion bushels of corn to ethanol will result in several billion bushels of co-product for which uses will have to be found. It is expected that biotechnology will be a key component of the total research portfolio that will lead to the development of the technologies necessary to feed this growing industry.

NABC 19 will focus on the opportunities for biotechnology to expand feedstock availability and

conversion, environmental sustainability, and co-product development for increased profitability under the following themes and related areas:

- emerging technologies for the production and/or conversion of novel biofuel feedstocks, and technologies to enhance production and to broaden the spectrum of feedstock sources;

- environmental and economic sustainability of feedstock production and associated biofuels conversion, and the potential of biotechnology to affect long-term sustainability on a national scale;

- development of technologies and new uses for the co-products of biofuel production (*e.g.* distillers grains from corn-ethanol production, glycerine from biodiesel production) to enhance profitability and environmental sustainability of biofuel production.

The meeting will be held in the heart of current North American ethanol and biodiesel production. A program committee composed of industry, government and academic personnel is developing the program and coordinating speakers. Speakers will include representatives of government, industry and academic research, spanning biotechnological

innovation, engineering development, environmental and economic analysis to coproduct development and utilization.

NABC 19 will convene on the SDSU campus in Brookings, South Dakota. Plenary sessions, question and answer sessions and breakout groups will be held in the recently completed student center on campus. On Wednesday afternoon (day 2) participants will tour a large-scale ethanol plant, a biodiesel facility, and co-product research facilities. The day will conclude with a barbeque and tour of the Ag Heritage and South Dakota Art Museum. The meeting will conclude following a luncheon on Thursday.

Please direct questions, comments and suggestions to:

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**“Large scale agriculture is in a period of transition, a paradigm shift, from the production of food, feed and fiber, to the production of food, feed, fiber and fuel”**

## Overview of NABC 18

### *Agricultural Biotechnology: Economic Development through New Products, Partnerships and Workforce Development*

NABC's eighteenth annual meeting, hosted by Cornell University, convened in Ithaca and Geneva, NY, June 12–14, 2006. Delegates were welcomed to Cornell by Bill Fry (Senior Associate Dean of the College of Agriculture and Life Sciences), and by Steve Slack (NABC Chair 2005–2006/Ohio State University), Tony Shelton (NABC-18 Host/Cornell) and Ralph Hardy (NABC President). Activities on the Monday afternoon, early Tuesday morning and Wednesday morning took place on Cornell's Ithaca campus, and buses transported the delegates for Tuesday lunch and afternoon activities at the Cornell Agriculture & Food Technology Park (CAFTP) on the campus of the New York State Agriculture Experiment Station, Geneva. The return to Ithaca included a stop to sample viniferous delights at the Chateau LaFayette Reneau Winery.

Presentations on past technology-transfer accomplishments and both national and foreign experiences in various structures that facilitate technology transfer provided a strong background for discussions on how public-sector research can produce economic growth through new products, partnerships and workforce development.

Session #1—*Past Successes, Future Prospects and Hurdles*—comprised plenary presentations by Alan Wood (Boyce Thompson Institute, *Agricultural Research: Beyond Food and Fiber*), Peggy Lemaux (University of California at Berkeley, *Agbiotech*

*Pipeline: What's in the Lineup?*), Ralph Hardy\* (NABC, *Research to Market/Public Good: Economic Perspectives*) and Deborah Delmer (Rockefeller Foundation, *Road Bumps and Pitfalls for Agbiotech*). Further presentations were made by Keith Downey (Agriculture Canada, *Rapeseed to Canola Rags to Riches*), K. Vijayaraghavan (Sathguru Management, India, *India: New Products and Opportunities*), Ana Claudia Rasera da Silva (Alellyx Applied Genetics, Brazil, *New Perspectives for Agbiotech in Brazil*), Zhanglian Chen (Agricultural University, China, *Chinese Agricultural Biotechnology in the Field*) and Peter Welters (Phytowelt, Germany, *Globalization of European Biotechnology: Commercialization of Agbiotech Products Despite Political and Legal Restrictions*).

Having invited NABC-member institutions to submit information regarding recent agricultural research beyond food and fiber with significant societal impacts, Alan Wood described outstanding contributions to society. Peggy Lemaux pointed out that new applications of genetic engineering in agriculture are not limited by the technology. Progress is clouded by factors outside the control of scientists, particularly of academic scientists, like high regulatory costs and limited access to key technologies because of intellectual-property protection. Consumer-acceptance will also be important. It is likely that modern biotechnology will play an increasingly

\*In place of Roger Wyse (Burrill & Company) who was unable to attend.

important role in other countries—China for example—where these issues are not likely to be key factors. Ralph Hardy outlined methods for science/technology transfer to market to achieve public good. He provided public- and private-sector examples of venture capital for early commercialization of agricultural science and technology. According to Debbie Delmer, 10% of people say that genetic engineering of crops is great stuff and another 10% hate it, while in the middle is a vast disengaged majority who really don't care, including many farmers in the developing world. People are growing tired of the debate. "It's time to get on with it."

The development of canola from rapeseed oil, described by Keith Downey, diversified Canada's agriculture base, eliminated dependence on imported vegetable oil and increased returns to producers while expanding markets at home and abroad. It resulted also in the establishment of a large rural-based, value-added oilseed-crushing and refining industry. The story continues in that canola is a preferred biodiesel source for northern climates because of its low content of saturated fatty acids. India's economy is among the fastest growing in the world—6% to 8% annually over the past decade—according to "Vijay" Vijayaraghavan. On the other hand, growth in agriculture has been less than 2%. A national mission is in progress to revive the under-performing agriculture sector by enhancing farm production and food quality while

reducing waste. The strategy includes attracting investments that will trigger high growth in agriculture and in the processed-food industry and partnering in global research initiatives that will help India to acquire as well as provide technologies. In Brazil, the production of ethanol from sugar cane has increased three-fold in the past 25 years. The current average yield is 6,000 L/ha. However, in line with the Kyoto Protocols, a production increase of at least 3-fold again will be needed by 2010 to satisfy projected demand. This goal is achievable as a result of Brazil's scientific expertise in breeding and genetic engineering, to increase productivity of sugar cane as a crop and improve efficiency of ethanol synthesis. The public debate in China on the safety of genetically engineered crops was "imported" from Europe, stated Zhianglian Chen. It is germane in particular to the improvement of rice productivity in that country, where GM varieties are in final field-trial stages. On the other hand, Peter Welters reported that the scare-mongering of anti-GM activists in Europe is increasingly recognized for what it is. Examples showing benefits of applying genetic engineering to plants are finding acceptance by the general public. "We have only to inform people correctly and constantly about the progress and the benefits of this new technology. Millions of farmers worldwide can't be wrong."

In session #2—*Function and Role of University-Based Research Parks in Economic Development*—presentations were made by Ashley O'Sullivan (Ag-West Bio, Inc., Canada, *From Tools to Products: The Evolution of Saskatchewan's Agbiotech Cluster*), Allen Dines (University of Wisconsin, *From Equines to Economic Development: The Story of University Research Park*), Wim Jongen (Wageningen Business Generator, Neth-

erlands, *Food for Innovation: The Food Valley Experience*) and Zhianglian Chen (Agricultural University, China, *The Chinese Experience in Innovation*).

"What is the bio-economy?" asked Ashley O'Sullivan. From the perspective of Ag-West Bio, it simply involves creating and capturing value from biological systems. The challenge and the opportunity for each region are the ability to understand and to effectively exploit global comparative advantages. The strategy at Ag-West Bio for Saskatchewan is twofold: (i) marketing their excellent bio-economic infrastructure, and (ii) identifying and targeting strategic opportunity sectors. Allen Dines' story of the University Research Park in Madison provided an instructive case study of how favorable outcomes can arise from university-established parks focused on fostering commercialization of university research. Recently, several companies have expressed interest in relocating to the Madison area as a result of opportunities from association with the university-research environment. The concept that science-based economical development is crucial for general economical development and competitiveness, according to Wim Jongen, begs the question of how to organize the process. The objective of the Food Valley cluster, developed in the Netherlands, is the creation of a network for innovation and business involving companies, research institutes, experimental facilities, incubators and public-private-partnership based R&D programs with the foci being food, health and nutrition. The initiative—by three city councils—has grown into a regional economic force. Zhianglian Chen reported that, since 1991, the Chinese government has encouraged university professors to form companies. Even in public universities, a professor can run a business from her/his own laboratory,

owning 100% of the company or shares thereof.

Session #3—*An Up-Close Look at One Research Park: the Cornell Agriculture & Food Technology Park*—took place at CAFTP as a "town hall" discussion moderated by Dan Fessenden (CAFTP). Brief comments from Michael Manikowski (Ontario County Development), Karen Springmeier (Finger Lakes Workforce Investment Board), James Hunter (Cornell University/New York State Agriculture Experiment Station), Susan Riha (Cornell) and Roger Williams (Cornell) helped to focus the discussion.

Dan Fessenden sketched a brief history of the New York State Agricultural Experiment Station, on the campus of which CAFTP is situated, and described the thinking that underpins the Park and the process whereby physical-plant infrastructure—a flexible technology facility—is now available for occupancy. It is envisaged that CAFTP will eventually occupy 70 acres of what was, until recently, apple orchards that had been "retired" from research use. Four start-ups, including agbiotech companies, occupy office space on campus and are expected to enter pilot production in the main facility in the near future. Ground-breaking is expected in 2007 of a USDA-funded grape-genetics research center.

Session #4—*Bridging the Gap: From Laboratory to Commercial Product*—comprised presentations from William Goldner (USDA-SBIR, *Vision, Opportunity, and Challenge: The USDA-Small Business Innovation Research Grants Program*), Richard Brenner (USDA-ARS, *Technology Transfer in the Agriculture Research Service*), Michael Adang (University of Georgia, *From the Bench to a Product: Academics and Entrepreneurship*), Mary Pat Huxley

(California Community Colleges, *The "Central Dogma" of Economic and Workforce Development*), Richard Broglie (DuPont, *Translating Discovery Research into Commercial Products*) and Paul Thompson (Michigan State University, *Technological Ethics in University-Industry Partnerships: The Best of Both Worlds?*).

Bill Goldner described the USDA's Small Business Innovation Research Program. This competitive funding program, authorized by Congress in 1982, stimulates and facilitates R&D by US-owned and -operated for-profit small businesses (<500 employees). All executive branch departments with extramural research budgets exceeding \$100 million are directed by legislation to provide a 2.5% set-aside to fund SBIR. Rick Brenner reminded the audience that the USDA helps drive continuous innovation through science and technology by forming Cooperative Research and Development Agreements (CRADAs) with research institutions and the private sector. The Office of Technology Transfer in the ARS is key in facilitating these partnerships and in transferring research outcomes for broad beneficial use by the public and agricultural industries of the United States and other nations. Given recent concerns about rising petroleum prices, the United States will be increasing research emphasis on new, environmentally favorable crops for industrial uses representing new economic opportunities for farmers and reducing dependence on imported fossil fuels. There is renewed hope that the most prosperous era in American agricultural history is dawning to meet continuing and expanding national needs. Mike Adang described his experience in translating research discoveries to a product and into a company, Insectigen. He discussed ethical conflicts between the role of the entrepreneur—which can be

time-consuming—and the role of the professor with obligations to students, to postdocs, to research colleagues, and to others in the university milieu. Mary Pat Huxley discussed development of the workforce in general and of the biotechnology workforce in particular. She remarked that the United States is not outpacing its competitors with as wide a margin as it did 40 to 50 years ago. Many workers are unable to meet new technical needs in the workplace, and incoming workers often fail to realize that innovation is the driver of the US economy. Such innovation increasingly relies on workers having scientific, mathematical and technical ability, alongside workplace-competency skills. Paul Thompson suggested that technological ethics are today better served in the private sector than in the universities. If so, university-industry partnerships could have the result of improving the capacity for university-based science to address ethical issues, if they bring some of the norms and practices that are commonplace in the private sector into the university. Or they could have the result of transferring the relatively weak ethics performance of university science to the private sector. While we can hope for the better outcome, his suspicion is that university-industry partnerships are likely to produce the latter.

The banquet presentation was by Mark Crowell (University of North Carolina,) *Knowledge Transfer and Economic Development: The Role of the Engaged University in the Twenty-First Century*) and an ancillary talk was given by Rick Welsh (Clarkson University, *Agricultural Biotechnology and University-Industry Research Relationships: Perceptions of University Scientists and Administrators and Industry*).

Mark Crowell discussed the function of the Association of University Technology Managers (AUTM), an

international organization with about 3,500 members. Mirroring the global economy, 25% of the membership is outside North America and growing at 2½ times the rate of the US group. The AUTM's *Better World Project* is an attempt to show the impact of public-sector research that is not necessarily reflected in terms of licenses, patents and revenue. Twenty-five in-depth stories of university innovation have been collated, demonstrating impact regardless of financial implications. A companion piece, *Reports from the Field*, contains a hundred similar stories in vignette form. These reports are being sent to all members of Congress and to agencies in Washington, DC, to promote understanding the important roles academic research and technology-transfer play in making our world a better place in which to live. According to Rick Welsh, industry funding generally brings modestly less basic and more excludable (e.g. patentable) research than does NSF or NIH funding. Industry is wary of the decline in the level of basic research at universities, but contributes to it through its funding relationships. This points to the importance to a number of parties of continuing to publicly fund basic research at universities.

In addition to Q&A discussions with audience participation at the conclusion of each session, breakout workshops were held, during which delegates, in smaller groups, had the opportunity to discuss further issues raised in the presentations, to raise other related matters and to make recommendations to share with policymakers. A summary of the workshops is provided elsewhere in this newsletter.

A fuller set of summaries of the presentations will be provided in *NABC Report 18* (projected publication date March 1, 2007), as well as manuscripts by the speakers.

## NABC 18 Workshops Summary<sup>1</sup>

Three workshop sessions were held, with nine questions posed to help focus the discussions. Participants were encouraged to formulate recommendations on the basis of the presentations and discussions at the plenary sessions as well as at the workshops. Some highlights of the workshop exchanges are presented here.

### SESSION 1

**Question 1: Should not-for-profit agencies, institutions and universities actively focus on economic and workforce development as part of their mission?**

- Taxpayers support public universities and may expect a return in the form of economic development.
- The land-grant institution may be viewed as a three-legged stool with teaching, research and extension. Some see economic development as a logical fourth leg.
- Community colleges in California saw positive effects from such a policy.

**Question 2: Have not-for-profit agencies, institutions and universities made an economic impact in the international, national, state, and local economies by creating new technologies/products/information?**

- Economic impact should be a “side-product” of universities; consideration should more commonly be given by faculty to formal relationships with specialists in economic development.
- The land-grant mission is to give away technologies. It should be redefined.
- The metric for economic development needs to be defined. Is it number of patents filed, how many technology transfers have occurred, other?

**Question 3: Does biotechnology represent a new paradigm, or just a continuation of what land-grant universities have done?**

- It depends on how biotechnology is defined. If the focus is on genetically

modified crops then it is a new paradigm because public-perception issues are integral.

- And the time to develop a GM product is greatly increased because of regulatory strictures and the need to patent genes and new technologies.
- If land-grant universities continue to focus on local problems for economic development, it will deplete international outreach efforts.

**Question 4: How do we communicate the role agricultural biotechnology plays, not only in food, feed and fiber, but also in human health, energy, chemicals and the environment.**

- In Europe they have tried to change the terminology.
- Demonstrating how important agriculture is in many areas of life beyond its traditional role may put it in a more positive light, with benefits for agricultural biotechnology.
- Agbiotech should be as transparent as possible.

### SESSION 2

**Question 1: What has the Cornell Agriculture and Food Technology Park (CAFTP) done right and what needs improvement.**

- CAFTP has a flexible structure amenable for many purposes.
- It is managed by a corporation, therefore funds are not being diverted from the research-station budget.
- There is positive involvement of the community, which was engaged early in planning.
- It is unclear how long businesses can

stay at the park?

- Would it be easier to find resources within a larger area?

**Question 2: Can CAFTP be replicated/modified for use at other universities?**

- It's just too early to say.
- Yes, in that this park is, at least to some degree, a replicate of others; those involved in the planning visited other parks and implemented what seemed to work.

**Question 3: What are the benefits/liabilities to the university of the CAFTP?**

- It will help attract faculty and students and provide jobs for graduates.
- A job-training program at the local community college system would be mutually beneficial.
- There is no direct loss to the university; however, its reputation may be positively or negatively affected depending on the success of the park.

**Question 4: What are the benefits/liabilities of having domestic/international collaborations between agtech parks?**

- This will depend on the site of manufacture.
- NABC could play a role in facilitating interactions between parks.
- Complications may result from sharing proprietary information.
- Collaborative projects moved elsewhere would give the impression of lack of commitment to the Geneva area.
- It was recommended that CAFTP

<sup>1</sup>This article draws on presentations at NABC 18 by Sarah Davidson, James Hunter, Tony Shelton (Cornell University) and Bruce McPherson (Pennsylvania State University) summarizing discussions within the workshops. The workshop facilitators were James Hunter, Z.B. Mayo (University of Nebraska-Lincoln), Bruce McPherson and Tony Shelton.

focus on community strengths: wine, value-added foods, and perhaps less on biofuels for example, which does not have a long-standing local base. Thus local investment may be encouraged.

- It is important to create a web of interactors; for example, advantage should be taken of the Johnson Business School on the Ithaca campus.

## SESSION 3

Question 1. What are the negatives of a land-grant university focusing on economic and workforce development?

- It isn't clear how the economic development mission will be viewed with teaching, research and extension in the tenure process.
- Workforce development is a component of teaching, whereas economic development is different.
- There may be intra-departmental conflict if some faculty members are more entrepreneurial than others.

Question 2: What are the barriers to economic and workforce development that will be encountered and how can they be overcome?

- There are few such barriers in today's climate.
- Adding economic development obligations may overburden university faculty.
- Being involved with economic and workforce development might bring university faculty more into contact with the private sector, with positive influence on the educational mission and preparation of students for workforce entry.

Question 3: How can a land-grant university balance the need for institutional revenue and the public good?

- The whole burden should not fall on the university, which would be problematic in today's resource-poor environment.
- In the US, public support for public

universities is declining, increasing the time faculty spend in seeking alternative sources of funding.

- The University Research Park in Madison, Wisconsin, provides a good example of balance.

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of Columbia. Some were pro-biotech, some were anti-biotech, and, as is typical in any legislative body, only a few of them actually became laws." But among those that did succeed are some that now *prevent outlawing* GM crops; according to Mr. Wazek's letter, eight states passed "preemption" laws—Georgia, Idaho, Indiana, Iowa, Kansas, North Dakota, Oklahoma, and West Virginia. So it appears that adoption of biotechnology will continue, especially in states where farming communities have the political power to confront the opposition. Still, it remains difficult to have an informed discussion on the issues, and confrontational methods and soundbytes predominate.

But back to California, my home state for 30 years before migrating east to Cornell. In the same update from AgBioView, Henry Miller—a fellow at the Hoover Institution and a speaker at NABC 17—doesn't pull any punches when he talks about the four counties there that have moratoriums on agbiotech. Outside of the questionable legalities of these local laws, Miller chides these counties for blocking "sophisticated genetic approaches to the eradication of blights such as sudden oak death, phylloxera, powdery mildew and Pierce's disease, a bacterial infestation carried by a leaf-hopping insect, the glassy-winged sharpshooter, that threatens a variety of crops in many of California's most productive agricultural areas."

According to ISAAA (<http://www.isaaa.org/>), 10 years after the first commercialization of biotech crops in 1996, the area grown to them has expanded to 222 million acres in twenty-one countries. This rapid adoption, unprecedented in agriculture, will likely continue as advances in biotechnology are seen to address the pressing problems of the twenty-first century. In an editorial in the July 2007 issue of *Nature Biotechnology*, biofuels are touted as a partial solution to the world's mushrooming energy demands and to the challenge of reducing greenhouse-gas emissions from fossil fuels. The editorial describes ethanol derived from corn as the immediate but transitional solution to our energy concerns. Biotech innovations will be central to ethanol production but even more so as biofuels move from "corn grain to more sustainable, energy efficient, but recalcitrant feedstocks such as cellulosic biomass." The editorial ends by pointing out that biotech's public image will be improved by the successes it will bring to energy production.

NABC is in the thick of this national discussion and has recently drafted a document, *Agriculture and Forestry for Energy, Chemicals and Materials: The Road Forward*. This document is being prepared to help inform public policy, part of NABC's mission. The document is also very timely as we look forward to NABC 19, which will be held at South Dakota State University on May 22–24, 2007, with the theme of agricultural biofuels. Will successes in the area of energy production help smooth the road for the adoption of other aspects of agricultural biotechnology?

NABC was created with the goals of addressing "the central questions of agricultural biotechnology from a multi-constituency perspective...and providing an open forum for persons with different interests and concerns to come together...to learn from

# NATIONAL AGRICULTURAL BIOTECHNOLOGY COUNCIL

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meaningful dialogue on the potential impacts of agricultural biotechnology". With the political challenges and the public's mixed view of biotechnology, and with new opportunities for

biotechnology to meet our energy and other non-food needs, NABC becomes an even more important player in the national dialogue about agricultural biotechnology. Our challenge will be to make ourselves even more relevant than we have been in the past. Because, more

than ever before, we live in interesting times.



## **NABC 19 — Mark Your Calendar**

### ***Agricultural Biofuels:***

### ***Technology, Sustainability, and Profitability***

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