



# NEWSLETTER

of the  
American Scientific Affiliation &  
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## “Embedding Christian Values in Science and Technology”

### ASA 2006 ANNUAL MEETING: TWO STREAMS BLENDING INTO ONE RIVER

*It was a weekend of stimulating ideas, often expressed in aptly-turned phrases. ASA’s Annual Meeting convened on the Calvin C. campus, July 28–31, 2006.*

*Perhaps the most succinct summary of the event’s purpose was in a little-known hymn that **Francis Collins** introduced. It pictured “faith and learning” as “two currents in a river” that converge to “deliver one coherent steady flow” (see lyrics on p. 12).*

*That combined current flowed throughout plenary and parallel sessions—informing discussions of stem cells and pandemics; applying Christian values in various disciplines; motivating involvement in appropriate areas of governmental policy; and ameliorating health, nutrition, and sanitation throughout the world.*

*One recurring theme was the challenge to get out of our comfort zones—*

*to use our scientific knowledge and biblical principles to influence legislation and to help the disadvantaged.*

*Someone said trying to absorb the vast volume of information at a conference such as this is like trying to take a drink from a fire hose. In this special issue, we’ve tried to capture a few cupfuls of the many highlights. Some of the overflow will appear in future issues. —The Editors*



Karen Lebacqz

### Pandemic Justice

Opening plenary speaker Karen Lebacqz originally planned a career in mathematics, when a scriptural passage rerouted her professional trajectory. The prophet Amos’ words, “Let justice roll down like waters, and righteousness like an ever-flowing stream,” influenced her to become a theological ethicist. She recently completed 30 years on the faculty of Pacific School of Religion, also teaching at McGill and Yale.

#### Priority Principles

Speaking on “Pandemic Justice,” she pointed out that a worldwide pandemic of bird flu or other disease would outstrip resources, forcing officials to pri-

oritize who should receive available resources. She suggested basing decisions on two ethical values: First, a fundamental commitment to the equal value of all people. Second, the option for the poor—giving special attention and care to the oppressed, marginalized, poor, and vulnerable.

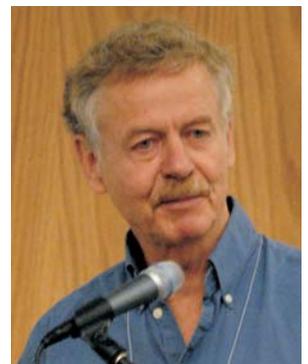
Medical need and “first come, first served” are two historically-honored standards. But when resources are scarce, one can learn other considerations from a wartime triage model.

A single case requiring urgent attention might absorb hours of time, during which numerous others would die. Under these circumstances, a third possible rule emerges: The greatest good for the greatest number. That standard can mean either saving as many lives as possible, or maximizing the army’s fighting strength by getting the wounded back into battle more quickly. NATO has a military triage system giving priority to those who can be quickly returned to service and then to those who are seriously injured and need immediate surgery. The hopelessly wounded are simply put aside.

*Continued on p. 3, Pandemic Justice*

### Nuclear Cloning, Embryonic Stem Cells & Cell Therapy: Promise, Problems, Reality

Rudolf Jaenisch of MIT developed the first transgenic mice and has used them to study cancer and neurological diseases.



Rudolf Jaenisch

He has pioneered a method of procuring embryonic stem cells without harming a viable embryo. Among his many honors and awards, he is a Fellow of the National Academy of Sciences.

He pointed out that as the population ages, there is increasing incidence of degenerative diseases. One potential solution is regenerative tissue repair, achieved by transplanting white cells.

*Continued on p. 2, Nuclear Cloning*

## The Executive Director's Corner

Randall D. Isaac

The weather was hot and the heat caused the picnic to be moved indoors, but no one seemed to mind. The 61<sup>st</sup> annual meeting of the ASA was by all accounts an inspiring event. A record 272 registered attendees surpassed the previous high of 258 at the Colorado meeting in 2003. This issue of the newsletter is devoted primarily to sharing the story of that meeting. If you missed it, plan now to come to the University of Edinburgh in Scotland, next year or to George Fox University in Newberg, Oregon, in 2008.

The meeting underscored once more the importance of face-to-face interaction. Books and journals and electronic media are wonderful ways of exchanging ideas, yet they fall short in the stimulation of personal interaction. Our function as a fellowship of Christians in science is of vital importance. An annual meeting that enables such fellowship is a necessary but insufficient means of providing such interaction.

To facilitate personal contact, we encourage each of you as members to participate in some of our active regional sections, to initiate small group discussions, or to form campus- or city-based ASA chapters. We frequently receive requests from members or pro-

spective members who want to meet with other ASA members in their area. Too few regions have an established group. If you are interested in pursuing this approach, please contact us, and we will be happy to assist you in any way we can.

A special feature at the annual meeting was the kickoff of a new initiative for ASA called "Expanding ASA's Reach." Based on a statement of our goals and objectives, this initiative spells out a broad vision of outreach for the future. The projects and activities are designed to enable ASA to be more visible to the various communities that we serve and to meet their needs.

We need your help to make this initiative a reality. Visit our website at [www.asa3.org](http://www.asa3.org) and look for the headline "Expanding ASA's Reach." This web page is restricted to members or others who are interested in working with us. The login and password were mailed to members. If you misplaced them, e-mail us at [asa@asa3.org](mailto:asa@asa3.org) with the subject line "Expanding ASA's Reach." We will be happy to give them to you. Please read the draft document and share your feedback with us, using one of the forums on our website. We intend to use this as a starting point to work out more detailed action plans.

Our ability to carry out these ambitious plans depends critically on you, our members, being interested and willing to participate and to take action. It will require your time and effort and significant funding from you, our donors, as well as from relevant foundations. For the next few months, we need to think carefully and prayerfully as we consider God's guidance in what ASA should do. Your feedback is vital in helping us set the plan. We look forward to hearing from you!



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## Nuclear Cloning, from p. 1.

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For more than 30 years, we have known that bone marrow transplantation could effectively treat diseases. But it is very difficult to find donors whose tissue is accepted by the recipient's immune system. So the long-term goal of stem cell research is to provide matched cells for customized tissue repair.

### Learning from Mice

Embryonic stem cells were first isolated from mice in the early 1980s but from humans less than ten years ago, in processes that result in the destruction of the embryo. In the late 1990s, scientists discovered mammalian cloning could be achieved by removing the nucleus from an egg and replacing it with a somatic nucleus from the individual being cloned. However, the overwhelming majority of efforts to produce a live clone fail due to the failure of the adult genes to reset appropriately for an embryo. Very few embryos manage to successfully reprogram all the necessary genes. Most die shortly after implantation; those that survive to birth generally experience adverse health effects. Dolly, for example, was very sick when she was euthanized at age 6.

In mice, cloned embryos have been used successfully as the source of embryonic stem cells. This approach might work in humans, but would still result in the destruction of an embryo. A new method is called "altered nuclear transfer" (ANT). With this technique, the nucleus to be transferred to an enucleated egg is altered—a gene essential for embryonic development is inactivated. Once transferred, the damaged zygote has no potential to develop into a fetus or newborn, but can develop to the stage from which embryo-like stem cells can be derived. These should be perfect matches to the original donor of the nucleus.

This technique still requires the use of eggs, something we cannot avoid, at least not presently, until we determine how the egg reprograms the adult genes. This may remain as a point of moral concern.

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Please send Canadian matters to: CSCA, P.O. Box 40086, 75 King St. S., Waterloo, ON, Canada N2J 4V1.

Send address changes and other business items to the American Scientific Affiliation, P.O. Box 668, 55 Market St., Ipswich, MA 01938-0668. Phone: (978) 356-5656; FAX: (978) 356-4375; E-mail: [asa@asa3.org](mailto:asa@asa3.org); Website: [www.asa3.org](http://www.asa3.org)

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Editors: David Fisher, Margaret Towne  
Managing Editor: Lyn Berg

## Pandemic Justice, from p. 1.

Lebacqz proposed, first, that “priority should be given to those who could be of most immediate service to the larger group to insure the saving of others.” That would include medical personnel, firefighters and police, others with competence to rebuild a community or to keep disaster from spreading, electricians, engineers, road crews and transportation workers.

Second, she advocated the “principle of conservation,” explaining, “The next level of priority should go to those who can recover with little medical intervention or with lower doses of medication.” A third priority group would be persons with dependents: those who have minor children under 14 or who care for aged parents or developmentally-disabled adults who cannot live on their own.

She noted, “The criteria that I propose here do not privilege me.” Ethics professors are not at the top of the list of people society considers indispensable in a pandemic or other emergency. That lack of the “hermeneutic of self-interest” seemed to add to her credibility.

## The Language of God: A Believer Looks at the Human Genome

Francis Collins summarized his new book *The Language of God: A Scientist Presents Evidence for Belief* (New York: Free Press, 2006). Almost 150



Francis Collins

years since *Origin of Species*, polarization between scientific and spiritual worldviews is as great as ever. Collins believes the best reconciliation is theistic evolution, a conclusion he bolsters by projecting a chart of the genomes of 28 species and stating:

Comparisons of our own genome with that of other species leave no

doubt as to the conclusion of a common ancestor for all living things on this planet ... Here is my thesis: God, who is not limited in space or time, created the universe and established the natural laws that govern it. Seeking to populate this otherwise sterile universe with living creatures, God chose the elegant mechanism of evolution to create microbes, plants, and animals of all sorts. Most remarkably, God chose to utilize the same mechanism to give rise to special creatures who would have intelligence, a knowledge of right and wrong, free will, and a desire to seek fellowship with him. This perspective is compatible with everything I know as a scientist, and everything I believe as a follower of Christ.

To overcome the emotional baggage attached to the expression “theistic evolution,” he suggests replacing it with the term *BioLogos*, derived from the Greek words *bios* and *logos*, expressing the belief that “God is the source of all life and that life expresses the will of God.”

## A Recovery of Wisdom As Virtue for an Ethics of Genetics

With Ph.D.s in both botany and theology, Celia Deane-Drummond is prof. of theology and religious studies at University College Chester, UK. She also serves on the Ethics and Law Committee of the UK’s Human Embryology and Fertilisation Authority. Of her appointment to that committee, she said she was invited because the

chairwoman saw that those who have a religious commitment are also worthwhile in terms of representing that section of the community that has a faith ... I actually disagree with the position that says that all public policy is necessarily secular ... The voice of those who have religious convictions also needs to be taken into account.

“Genethics” is a contraction of “genetic ethics.” Biomedical ethics is often based on principles of beneficence, autonomy, justice and non-maleficence—principles which become a specialist science, through which doctors and other clinicians try and decide what is best to do, in making difficult decisions. “Genethics” is an overlapping field with biomedical ethics, but it includes the work of genetic scientists like **Francis Collins** and others.

## Beyond Reproduction

The theological reflection in the field has often been limited to reproductive technologies,



Celia Deane-Drummond

including debates about the status of the human embryo, frequently ignoring wider social questions and political issues. For example, she pointed out the need for ethical considerations when using genetic profiles in such decisions as health insurance or job assignments.

Regarding genetic screening of embryos, she quoted one spokesperson saying a policy choice must be made between reproductive autonomy of the parents and socio-economic considerations, which she interpreted as, “In other words, it’s too expensive to keep maintaining a deaf child after they’re born.” She questioned that pragmatic approach, reasoning that “screening out a deaf child, implies that the child has a life not worth living. That would be unacceptable to most people.”

Speaking of the misuse of technology, she quoted C. S. Lewis’ statement, “Human subjugation of nature leads to humanity’s subjugation.” To avoid that, she advocated virtue, defined as:

those aspects of character formation that help to provide those human strengths that are needed in seeking what might be the good, and in

deciding what might be the principles needed in areas where such principles and goods are in dispute.

### Prudence as Practical Wisdom

Prudence is not simply restraint or conservation of one's own resources. It is much deeper than that, a proactive concern for the good. Like a magnetic marker pointing north, it shows virtue the way to express itself. Its phases include deliberation, judgment and action.

In the fullest sense, human wisdom is only possible through the gift of the Holy Spirit by the grace of God. "Virtue is not about straining after the good in independence of God, but rather correct virtue flows from a life of faith in God in Christ." Aquinas made the theological virtues of faith, hope and charity prerequisites for all the other virtues, "the ground on which these other virtues as gifts can develop and the ground on which divine grace can work."

Deane-Drummond says that needs to become a way of "embedding Christian values in the practice of science and technology."

## Religion, Science and Politics

**Vernon Ehlers** is the first physicist ever elected to Congress, and the first physicist this high in government since Ben Franklin. He has been an ASA member for 40 years, teaching physics at UC-Berkeley and then at Calvin. He is currently serving his sixth term in the House of Representatives, representing Michigan's Third District. On the Science Committee, he chairs the Subcommittee on Environment, Technology and Standards and the Education and Workforce Committee. He is co-author of the book *Earthkeeping: Christian Stewardship of Natural Resources* (Eerdmans, 1980) and *Earthkeeping for the 90s: Christian Stewardship of Creation* (Eerdmans, 1991).

Ehlers lamented that some scientists call Christians ignorant and supersti-

tious, and some religious fundamentalists talk about "godless scientists." He asked how one can achieve equilibrium to be fully Christian and fully scientific, and how to explain it to fellow believers and to fellow scientists.

He began his answer by pointing out that on the average secular university campus,

The majority of the believers among the faculty are in the sciences and engineering ... This perception that somehow scientists are godless, or that scientists are seeking to disprove God, is simply inaccurate.



Vernon Ehlers

Most people think the creation or evolution of human beings was the main creative activity of God. He believes the real creation of God is not just matter and energy, but even more importantly the laws of nature. "So when scientists disregard God, they're disregarding the entity that created what they have spent their lives studying."

### The Wrong Question

People frequently ask him whether science disagrees with the Bible. He says that's the wrong question; the right question is, "Why does science disagree with theology?"

Because God is infallible, there has to be perfect agreement between the Special Revelation he provided in the Bible and the General Revelation he gave in Nature. But fallible humans study the two infallible revelations and get fallible answers on both sides. Too many people believe their interpretation of the Bible is infallible. So the ques-

tion is not science versus the Bible, but science versus theology. These are human enterprises, and our task as Christians is to try to meld those two, so that our understanding of the revelations makes sense.

Philosophers and common belief tend to distort the results of science. Probably the worst example is Einstein developing the theory of relativity, saying all motion is relative. From that philosophers and some theologians said *everything* is relative, including morality. When encountering scientific discoveries distorted into philosophical aberrations, many Christians think "those scientists have done it again." Science gets the blame, when scientists have not created the problem.

### \$10 Gasoline & "Purple Energy"

Regarding energy, he said \$10/gallon gas may be the best solution to encourage less use and alternatives. Part of the problem is that, to most people, energy is intangible. He added, "I wish energy were purple ... If you could see a big purple cloud around an SUV and a smaller cloud around a Prius, more would buy a Prius."

Rhetorically asking what the Bible says about government and politics, he answered, "Not much," except to obey the government. He said:

There is a great need for Christians in public office; there is a great need for scientists in public office. Each of you can fulfill both of those requirements. It's awfully lonely for me to be there ... Less than 1% of the Congress is scientists, and that's not enough, considering all the many scientific and technical issues we deal with.

He said the best political advice is Micah 6:8: "He has shown you, O man, what is good. And what does the Lord require of you? To act justly and to love mercy and to walk humbly with your God," and reminded us of Edmund Burke's adage: "All that is necessary for evil to triumph, is for good men to do nothing."

# Memories and Reflections

As 2006 ASA Executive Council president, I had the additional honor and privilege of serving as the 2006 ASA Annual Meeting Program chair. From my vantage point, the conference beautifully reflected ASA's mission featuring Christian scholarship, education, fellowship and service.

We enjoyed five outstanding plenary speakers—Karen Lebacqz, Rudolf Jaenisch, **Francis Collins**, Celia Deane-Drummond, and **Vernon Ehlers**—excellent presentations producing thought-provoking discussions. Seven special symposia coordinated by 14 organizers and several general sessions featured scholarly presentations of 85 participants; a first-rate poster session featured 25 research posters by undergraduate and graduate students, post-doctoral fellows, and faculty. The sessions were well attended and the discussions lively, often extending to protracted conversations during breaks and over meals. Thanks to the work of the symposia coordinators, presenters, the leaders of devotions and the ecumenical worship service, the ASA staff, and the local arrangements staff, the conference program greatly exceeded my highest expectations!

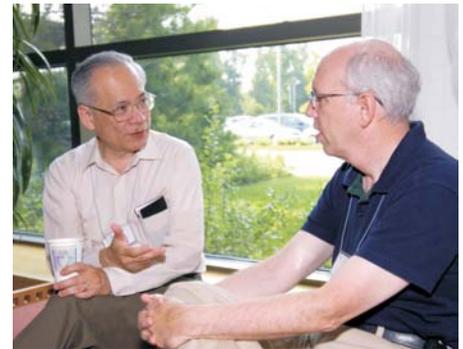
Some of my fondest recollections simply reflect God's providential care and blessings to and/or through conference participants:

- The standing ovation given to **Randy Isaac** for his leading of ASA.
- Francis Collins meeting with students and early career scientists, late on Saturday night, seated in a large circle, answering their questions, encouraging them to be good scientists and good Christians, then quietly leading them in prayer. Students later told me it had been exhilarating, inspiring ... and exhausting!
- Our Sunday morning Ecumenical Worship Service celebrating our unity in Jesus Christ.
- God's artistic display in the Sunday noon brief but intense thunderstorm.
- A recent college graduate talking privately for 45 minutes with Karen Lebacqz about her experiences at Yale U. and his graduate work beginning there this fall.
- The generosity of conference participants who funded 25 scholarships for students and early career scientists to participate, gave \$2,828 to ASA in our business meeting, and presented an offering of \$975 on Sunday morning for Indonesian Tsunami Relief through the Christian Reformed World Relief Committee.
- A crowded poster session where young researchers inspired aging veterans with their cutting-edge science research projects.

Experienced by more than 270 conference participants, well, you do the math ... inspiring memories to last our lifetimes. ☒ **Hessel Bouma III**



Heather Kooiman discusses her research with Miranda Bestman and Ryan Norton.



T. Timothy Chen and Paul Arveson engaging in conversation.



Tour of grounds around Helen Bunker Interpretive Center



Francis Collins meets with students and early career scientists (l to r): John Vander Heide, Janelle Rekman, Sarah Hofman, James Gregory, Johnny Lin, Andrew Lohse, Jennifer Headley, Ruth Bancewicz, Soochin Cho, Kwan-Ho Chung, John Thornton, and David Hollman.

# Worship



Rev. Scott Hoezee preaches at the ASA Ecumenical Worship Service.



# Fellowship



# Education



# Summaries of Symposia

## Science and Technology in Service to the Poor

One track devoted most of Saturday to the theme “Science and Technology in Service to the Poor.” **Martin Price** led off with the perspective of his ECHO (Educational Concerns for Hunger Organization) group, stating that its goal is “to bring glory to God and a blessing to mankind by using science and technology to help the poor.”

He said that if results are to reach the poor, an item generally must cost the recipient nothing or almost nothing. Exceptions are (1) if the goal is to develop something you hope generous benefactors will pay to make available, e.g., HIV/AIDS drugs, (2) new technology becomes the basis for local micro-enterprises that generate employment, e.g., coconut processing or (3) it is of help to organizations that will use it in ministry, e.g., test strips for malaria.

He recommended four online informational resources:

1. ECHO publication *Using Science to Help the Poor: Low-Budget Research Ideas*, available as a PDF file at [www.echotech.org](http://www.echotech.org).
2. *Trees for Life Journal*, [www.TFLJournal.org](http://www.TFLJournal.org)
3. *International Journal for Service Learning in Engineering*, [www.engr.psu.edu/IJSLE/home.html](http://www.engr.psu.edu/IJSLE/home.html)
4. A document with specific research ideas, <http://echotech.org/mambo/docman/usingsci.pdf>

Doctors in impoverished regions of the world often have medicines available to them, but no reliable way to diagnose a patient’s illness. The problem is especially acute in areas that lack electricity, refrigeration, and running water. Malaria kills 3,000 people daily, 75% of them under age 5. In her presentation, “Using Immunoassays to Create Affordable Diagnostics,” **Alynn MacLean** described a simple diagnostic test that costs less than \$1 per patient, now being used in several countries.

**Francis Collins** related an experience of diagnosing a lethal condition he had never seen before, and treating it “with his heart in his mouth” by surgical intervention with improvised equipment in Nigeria (details in the next issue).

Other participants in this track shared success stories—converting coconuts into renewable energy and other value-added products, anti-malarial activity of two vari-



**Walter Bradley** shows the potential zones of coconut production.

eties of papaya, antibacterial properties of several compounds extracted from *Moringa oleifera* seeds, using velvet bean as food and feed, and achieving sustainable health benefits for community water systems.

✉ **Martin Price**

## Stem Cells: Science, Ethics and Public Policy

• The “Stem Cells” symposium had three sessions. **Session I** included papers on basic science and early clinical studies involving human and animal stem cells. Both the basic science and early clinical research into stem cell-derived therapy of human disorders are moving ahead broadly on many fronts.

Rudolf Jaenisch outlined the considerable creative effort that is being made to find useful alternatives to human embryonic stem cells as the basis for potential cell-based therapies. He included potential sources of pluripotent stem cells such as somatic cell nuclear transfer (SCNT), cell fusion techniques, and the alteration of adult stem cells to become less niche-dependent. He articulated the promises and the pitfalls of these techniques, highlighting the need for much work to be done before human alternatives are identified and applied to specific clinical disorders.

Other speakers showed the broad applications already being explored in early clinical studies. **Jay Hollman** discussed ongoing work in developing cell-based therapy for myocardial infarction and congestive heart failure, and **Brian Greuel** presented its application to Parkinson’s disease. Kyle Orwig described work in treating chemotherapy-induced infertility, using germline stem cells in a nonhuman primate model.

Clinical studies to date have tested for the feasibility and early hints of efficacy

using human stem cells from multiple sources including blood, bone marrow, and heart tissue for patients with heart diseases, while the search continues in animal models using embryonic stem cells, fetal germ cells, bone marrow and umbilical cord stem cells, and neural stem cells for Parkinson’s disease. Identifying optimal stem cell sources and effectively-altered cell-based products for specific disorders must occur in humans before more definitive clinical studies can be initiated.

✉ **James Rusthoven**

• Stephen Matheson began **Session II** by summarizing how embryonic stem cells (ESCs) can be used to alter mice genetically. This has usually involved incorporating genetically altered ESCs into chimeric embryos, which are then transferred into a foster mother. The chimeric animals are bred to produce animals that have the genetic alteration in all cell types. This technology can use ESCs to produce transgenic mice where a gene is simply added to the mouse genome to see what effect it has on development or other biological processes. That gene may be expressed in all cell types, or its expression may be restricted to specific tissues or organs. Other applications rely on homologous recombination to replace an endogenous gene in the mouse genome with a mutant form or a different gene altogether.

Human ESCs have most of the properties and capabilities that mouse ESCs have; therefore, the possibility exists for them to one day be used for targeting genetic modifications to the human genome. The recent derivation of functional male gametes from mouse ESCs differentiated in culture may suggest an approach that could be applied to human ESCs to expedite the “production” of human beings that carry a particular genetic alteration in every cell of the body. He challenged us to be proactive in examining the ethical questions raised by the prospects of this type of human genetic engineering.

William Hurlbut focused on the ethical concerns raised by the prospects of successfully generating human embryos by somatic cell nuclear transfer (SCNT) and then dismantling those embryos at a pre-implantation stage in order to generate human ESCs. As a member of the President’s Council on Bioethics, he advocated a technique called Altered Nuclear Transfer (ANT), potentially enabling the generation



Moderator **James Rusthoven** introduces speakers at Session I of the Stem Cell Symposium.

of advantageous human pluripotent stem cell lines without having to create (and later destroy) human embryos. It involves knocking out the expression of a gene (e.g., *Cdx2*) that is essential for development of the trophoblast lineage in a human cell used as a donor for nuclear transfer. Following transfer to a human egg, the altered nucleus would form an unorganized clump of cells that lacks the capacity for implantation or further development as a human embryo. If a human embryo does not exist, as he asserts, it removes the ethical concerns of using these cells for the derivation of human pluripotent stem cell lines. The potential feasibility of using this ANT approach with human cells has recently been demonstrated by MIT stem cell biologists Rudolf Jaenisch and Alexander Meissner who used this procedure to derive pluripotent stem cell lines from mice.

**James Peterson** explored the theological and ethical implications of the ANT proposal. After describing several views about when a “fellow human being” begins, he concluded that ANT makes the greatest moral difference to those who hold the view that life begins at conception. Because ANT intervenes before conception, according to this view no embryo is formed; therefore, no human being is involved. However, Roman Catholics believe all procreative acts ought to be open to new lives and reject any kind of interference with the natural process of procreation; they would not likely be satisfied with the ANT proposal. Hurlbut disagreed, explaining that the Cardinal who is now head of the Congregation for the Doctrine of the Faith in the Vatican has expressed “interest in and encouragement of” his proposal. Peterson concluded by saying that working through the status of developing human

life in ever greater precision has ramifications far beyond ANT.

Karen Lebacqz considered other ethical issues. She was troubled by the potential exploitation of women as egg donors for SCNT, citing concerns about the health risks associated with superovulation and the ethical issue of whether or not to pay women for this service.

She raised the issue of justice in access to stem cell therapies, suggesting that it would be available only to the rich. Karen was skeptical that adult stem cells would solve the ethical dilemmas raised by the establishment of human ESCs, but that it would just raise new issues instead. She expressed concern, for example, about experiments in which human stem cells (adult or embryonic) are transferred into animal models.

Finally, she raised the question, “How long do we want people to live?” Should we deplete scarce medical resources by prolonging human life virtually indefinitely, or should we take greater steps to insure that adequate medical care is available to all? ☒ **Brian Greuel**

• In **Session III**, **James Rusthoven** cautioned that stem cell therapies should be developed with the same long-term perspective that is needed in the development of drug therapies for cancer. **Hessel Bouma** proposed that embryos indefinitely stored or discarded from IVF could be a compromise source of human embryonic stem cells. Participants in the ensuing panel discussion concurred that embryos are already important to many lines of research and that embryo-type stem cells seem to have unique potential for tissue-replacement therapies.

The day’s presenters and audience then primarily wrestled in an active and thoughtful interchange about the definition and moral status of human embryos. Some thought at such an early stage of development that human embryos should be treated as any other human tissue. Others argued that only embryo-like entities should be available for research and therapy. A future issue of *PSCF* will carry several articles from the symposium in the detail needed for readers to evaluate them.

☒ **James C. Peterson**

## Models for Teaching of Origins

The sessions on “Models for Teaching of Origins” engaged healthy dialog from participants and the audience. Each session was attended by 30 to 100 people. Presenters included individuals from state universities and Christian colleges, and others who follow the issues of origins. They offered interdisciplinary approaches to the teaching of origins and a wide variety of pedagogical formats. Some courses include theological and biblical views offered by those who teach in those disciplines; others offered more integrated courses specializing in the integration of the sciences.

A common theme was the desire to have students understand that there can be a variety of faithful biblical interpretations of origins. Another important theme is that God’s revelation is two-fold—in creation and in Scripture. Conflicts may arise in our interpretations of the two revelations, but not between God’s revelations themselves. Thus science as a fallible human interpretation of God’s revelation in creation may be in tension with theology as a fallible human interpretation of God’s revelation in Scripture.

Pedagogies included writing assignments with comparative and contrast emphases, writing theses on topical issues, debates, case studies and responses, lectures, discussions, and almost all offered good reading lists.

Challenges were expressed in offering courses and included offering definitions to terms used in the vernacular, limiting the enormous amount of literature available on the issues, bringing fair representation to views and positions, and crafting seminar series to address the issues. One significant pedagogical issue is the need to clarify the various meanings of evolution and to help students understand the vari-

able levels of empirical evidence for the different meanings of evolution. Many handouts emerged in this series of papers and the authors of these papers enjoyed excellent feedback and comments.

✉ *Uko Zylstra* and *Dorothy Chappell*

## Christian Values in Biotechnology

Gordon C. biologist **Ming Zheng** fittingly launched the “Christian Values in Biotechnology” symposium by summarizing the peril and potential of genetically modified (GM) foods. Describing first how these organisms are generated using recombinant DNA technology and transformation methods, Zheng then elucidated opposing religious, scientific, and socio-economic arguments before projecting how biblical themes of truth and justice might inform the debate.

Next **Charles Adams**, dean of natural sciences at Dordt C., explained his institution’s philosophical struggles over “getting in bed with Frankenstein” (deliberations over offering a biotechnology major). Key in their discussions was uneasiness with the reductionistic worldview of biotechnology. Adams offered epistemological humility and a holistic Christian worldview as necessary correctives.

Building on this theme of a Christian vision for critical engagement in biotechnology, Dordt biologist **Tony Jelsma** pointed out examples of where reductionism fails to offer a full explanation of biological systems. Defining “shalom” in terms of forming and developing relationships—both human and nonhuman—Jelsma indicated, “the greater the loss of shalom in the organism or environment, the greater the likelihood of unanticipated consequences.”

**Paul Arveson** offered insights into reductionism from his perspective as a physicist. Building on Jacques Monod’s idea of “gratuity [as] the freedom from any

chemical or structural necessity in the relation between the substrate of an enzyme and the other small molecules that prompted or inhibited its activity,” Arveson laid the conceptual groundwork for consideration of systems as a corrective to reductionism’s limitations, adding, “Machines do not a cell make.”

Biologist **Hank Bestman** of Kings University C. overviewed molecular systems biology, an emerging discipline that blends reductionist and reconstructivist paradigms. He explained how iterations of modeling and testing through perturbation can provide insights to emergent properties, robustness, and modularity of complex biological systems. Demonstrating how a systems approach addresses nitrogen deficiency in crops, Bestman led us to this fundamental question: “What defines the system?”

**Janina Mobach**, an undergraduate in Bestman’s lab, next presented her systems biology research, mapping carbon flux in *Chlamydomonas*. She was able to dispel metabolic misconceptions and overcome technical inconsistencies—a testament to the power of a well-defined model system, appropriate technology, and a dedicated student!

Calvin C. biologist **David Koetje** concluded the symposium by offering a vision of how criticism of reductionism and engagement in systems approaches might inform the development of a paradigm in agricultural biotechnology that promotes its sustainability. Koetje offered systems biology as evidence of early stages in a shift to a “place-based paradigm.” Place-based biotechnology, he proposed, will seek to reinforce ecological and social interrelationships within agroecosystems, making them more resilient. Koetje stated:

If the vision of these Christian scholars holds sway, then there is reason to hope that biotechnology will contribute to sustainability as an appropriate instrument of shalom.

## Science in Context: Putting Science in its Place

The “Science in Context” session was devoted to exegetical, historical, and philosophical contours of scientific practice and interpretation.

Previewing a forthcoming book, **Davis Young**, emeritus professor of Calvin C., examined different uses/versions of the principle of accommodation utilized by John Calvin. He lamented the fact that so many theologians have not followed Calvin in incorporating this hermeneutic approach to the interpretation of biblical texts.

**Christopher Kaiser** of Western Theological Seminary examined the role beliefs played in early modern science (e.g., Kepler) and still play in modern science in such figures as Paul Davies, E. O. Wilson, and Albert Einstein. Two beliefs in particular were elucidated: the belief that the world is intelligible, i.e., that its order is rational, and secondly, that a correspondence exists between the intelligence of the laws of nature and human intelligence. (Again a foretaste of a forthcoming book.)

**Ted Davis** of Messiah C. presented a narrative dealing with various versions of the warfare thesis between science and religion and how this conflict was articulated in the views of Chicago modernists. He showed that the theologians of the “Chicago school” such as Shailer Mathews reject both concordism and Asa Gray’s orthodox version of theistic evolution. Tradition and authority were considered to play no role in theology. For some, the warfare thesis led to a “religion of science.”

While the first three talks were more or less historical in nature, the last two were more philosophical. **Arie Leegwater** and **Matt Walhout**, both of Calvin C., presented complementary lectures on the role interpretation plays in scientific work. The choice, Leegwater argued, is not between the discovery or the invention of scientific knowledge, but is rather much closer to the notion of the shaping of knowledge (*à la* Martin Rudwick). This effort attempts to recognize both constitutive subjective (interpretive) factors and constitutive objective (invariant) factors in the making of scientific knowledge. Interpretation is to be viewed as a good thing, a sign of our finiteness rather than a result of our fallenness.

Walhout challenged his listeners to question the relevancy of the ODD (Objec-



Biotechnology Symposium panel members (l to r): **Ming Zheng, Craig Story, Paul Arveson, Hank Bestman, Janina Mobach, Charles Adams, Tony Jelsma, and David Koetje.**

tive Description and Decryption) interpretation of science which holds that objective principles of order have been built into and can be read out of creation. Such philosophically presumptive assumptions foreclose an important debate about scientific practice that we should be holding with post-positivist philosophers of science like Joseph Rouse. Such discussions will give us a more expansive view of responsibility as well as a faithful Christian interpretation of scientific vocation. ✉ *Arie Leegwater*

## Christian Values in Engineering, Technology and Physical Sciences

The symposium “Christian Values in Engineering, Technology and Physical Sciences” offered eleven papers on subjects related to ethics in engineering, values in technology, and practical issues that arise in applying the results of science to the human situation. Calvin engineering prof. Randy Brouwer related his experience as an IEEE-USA Congressional Fellow, serving as a technical advisor to Rep. Dana Rohrabacher in 2005. His presentation on “Science and Engineering in Public Policy: Getting Out of the Boat in Washington, DC” discussed how Christians in science and engineering may need to stretch out of their comfort zones, comparing it to the biblical incident of Peter stepping out of the boat in faith.

Two papers discussed ethics in engineering education. Gayle Ermer, from Calvin C., spoke on “Professional Engineering Ethics and Christian Values: Overlapping Magisteria.” She contended that ethics and Christian values are often taught as independent topics, but really should be considered together as intertwined concepts. **Bill Jordan** followed up with his paper on “Teaching a Christian Engineering Ethic.” He offered practical advice and tips for teaching ethics in the engineering classroom based on his experience with an ethics course at Baylor U.

**Carl Fictorie**, Dordt C. chemistry prof., discussed how to define the discipline of chemistry. He took the definition of technology provided in the book *Responsible Technology: A Christian Perspective* edited by Monsma (Eerdmans, 1986) and adapted it to describe chemistry.

In her paper, “Beyond Stewardship: A Franciscan Look at the Christian Engineer as Mediator,” Sister Damien Marie Savino discussed her research on St. Bonaventure’s



Stewardship, Conservation, and Land Management Symposium panel members (l to r): **Janel Curry**, Mark Bjelland, Randall Van Dragt, **David Clements**, **Karen Steensma**, and **John Wood**, Moderator.

theology of human mediation. Humans are “mediators in the middle, between the non-human creation and God.” Humans hold a special place since they are the only creatures created in the image of the Creator. In Bonaventure’s theology, “creation is subject to humans, but only inasmuch as humans are subject to God.” Savino spoke on the healing role of the mediator and provided an applied case study of environmental clean-up efforts along the Anacostia River.

**Chuck Vandergraaf** spoke on “Christian Values and Nuclear Energy.” He said uranium and thorium are, with fossil fuels and solar energy, part of the resources God has given humans and argued that “compared to other methods of energy conversion, nuclear power has an excellent safety record.”

Celia Deane-Drummond spoke on wonder and wisdom as part of values in science. **James Gregory** talked about work with NASA and FAA on noise reduction around airports, pointing out that residents near airports are usually lower-income families who have little option to move elsewhere, thus tying the topic to Lebacqz’s “option for the poor” criterion of justice. Kamalini Martin looked at constraints and criteria for design. **Jack Swearengen** explored the scriptural foundation for technology assessment, pointing out the need to assess the impact of products continually throughout their design lifetime, because nasty surprises are difficult to predict. Keith Vander Linden spoke on Project Connect, a program providing IT training and free computers to at-risk groups in the Grand Rapids area.

**Ruth Douglas Miller** summarizes:

Through 3 or 4 annual meetings now, we have developed a small but coherent group of engineers enjoying each other’s fellowship, deep thoughts on

what we do, and how we deal with shared problems.

She sees its importance “to contemplate, not only each design problem, but overall ... what it is that engineers *do*.” ✉ *Steve VanderLeest* and *Ruth Douglas Miller*

## Stewardship, Conservation, and Land Management: A Cross-Campus Check-up

On land holdings of a few tens to thousands of acres, North American colleges and universities are preparing the next generation of leaders for the Church and society. The symposium asked, “What are we doing with the land? And what impression of land stewardship do students gain?” Data from 43 small- to medium-sized Christian colleges, first reported at this meeting, show that these institutions steward 8,000 to 10,000 acres of land. But while almost all have a master development plan, only a few have either a land use policy or a land management plan. Yet the campus is not an island, and stewardship decisions have significant environmental impact inside and outside campus boundaries.

Symposium presenters considered what they saw as the bridges and barriers that exist today to sound campus land management. Progress has come in many forms. In some places, sensitive wetland and prairie habitats have been protected or restored. On several campuses Red Listed, endangered species are being protected. And in every place the campus has become the classroom. Planting local species not only beautifies the campus, but it pedagogically enriches it too. Our colleges are showing

great creativity and initiative in caring for creation.

Despite progress toward environmentally sensitive land management, there continue to be countervailing trends. On average, the survey showed campuses are already 65% developed, and expansion continues. Master plans are often detached from sound management guidelines, so colleges, as one presenter said, are often “accidental developers.” It is not unusual to have several incompatible projects planned for the same space. This happens when one part of the community isn’t talking with another. Effective land management plans must arise from the mission of the college or confessions of the supporting communion. But, as one field station director observed when commenting on his own search for a land management rationale, in such matters, “Who pays attention to the confessions?”

The undergraduate years are emotionally intense, and alumni often report a lifelong bond to their campus. This sense of place, especially for the physical space in

which this experience grows, has gone largely unexamined. The eleven papers in this symposium showed that the lessons of the land are being sharpened every day. Good land stewardship is within our grasp.

✉ **John Wood** and **Randall Van Dragt**

## Coming Events

- Sept. 14–15.** The 25<sup>th</sup> anniversary of the Center for Theology and the Natural Sciences (CTNS) will be celebrated in Berkeley, CA. Call (510) 848-8152 or E-mail: [ctnsinfo@ctns.org](mailto:ctnsinfo@ctns.org) See [www.ctns.org](http://www.ctns.org)
- Sept. 21–22.** “Crumbs from the Table? The Creation of Wealth and the Persistence of Poverty.” Yale Center for Faith and Culture, Sarah Smith Conference. Speakers include Tony P. Hall, Ambassador, UN Agencies for Food and Agriculture; Vinay Samuel, Executive Director, The Oxford Center for Mission Studies; Collin R. Timms, Chairman, The Guardian Bank, India; Henry B. Wright, Prof. of Systematic Theology; Miroslav Volf, Director of Yale Center for Faith & Culture. Details at [www.yale.edu/faith/ss/crumbs.htm](http://www.yale.edu/faith/ss/crumbs.htm)
- Sept. 22–23.** “Christianity & the Environment: Finding Balance between the Natural, Human, and Engineered Worlds,” U. of Minnesota, St. Paul, MN. Sponsors: MacLaurin Institute & InterVarsity’s Graduate and Faculty Ministry. Speakers: **Rolf Bouma**, **Cal DeWitt**, Steven Bouma-Prediger, Susan Drake Emmerich. Details at [www.christianenvironmentconference.net](http://www.christianenvironmentconference.net)
- Sept. 28–30.** “Emergence: A Better Vision of Nature, Science, and Religion?” Chicago. A research conference organized by the Zygon Center for Religion and Science, in collaboration with UC-Santa Barbara where a major research project “New Visions of Nature, Science, and Religion” is almost complete. Speakers include Philip Hefner, Antje Jackelen, Barbara King, and Gregory Peterson. See [www.zygoncenter.org](http://www.zygoncenter.org)
- Sept. 29.** “Darwin or Design? Resolving the Conflict,” U. of South Florida, 7:00 p.m. Speakers: Michael Behe, **Ralph Seelke** and Jonathan Wells. Moderator: **Tom Woodward**. Sponsor: Physicians and Surgeons for Scientific Integrity. Details at [www.doctorsdoubtingdarwin.org](http://www.doctorsdoubtingdarwin.org)
- Sept. 29.** Washington Theological Consortium, Washington, DC, 12:15–2:00 p.m. E-mail: [wimmer@wtu.edu\\_joseph\\_wimmer](mailto:wimmer@wtu.edu_joseph_wimmer)
- Sept. 29.** “Science & Genesis: Is There a Conflict?” and “More Than ID.” Tyndale U., Toronto, ON. Speaker: **Hugh Ross**. Details at [llillard@tyndale.ca](mailto:llillard@tyndale.ca) or [www.reasons.org/events/index.shtml](http://www.reasons.org/events/index.shtml)
- Sept. 29–30.** “Have Astronomers Identified the Creator?” and “Astronomers Discover Humanity’s Destiny in Space, Time & Physics,” U. of Toronto, St. Michael’s C. Speaker: **Hugh Ross**. Details at [www.reasons.org/events/index.shtml](http://www.reasons.org/events/index.shtml)
- Oct. 24.** Skeptics’ Forum at U. of Florida, Gainesville, 7:00 p.m. Speakers include **Hugh Ross** and Fuz Rana, both of Reasons to Believe. Details at [www.reasons.org/events/index.shtml](http://www.reasons.org/events/index.shtml)

- Oct. 25–29.** “Breakthroughs in Contemporary Cosmology: Process Contributions toward a new Synthesis,” Claremont, CA. Since theories about creation have theological implications, this conference will encourage scientists to address the religious significance of their data. Contact J. R. Hustwit at (909) 621-5330 or email: [events@ctr4process.org](mailto:events@ctr4process.org)
- Oct. 26.** “Religion and Modernity in Conflict,” Center of Theological Inquiry Public Lecture Series, Princeton, NJ. Speaker: Gregory Baum, 8 p.m., Luce Hall, 50 Stockton St. [www.ctinquiry.org/resources/lectures.htm](http://www.ctinquiry.org/resources/lectures.htm)
- Oct. 26–28.** “Religion and Postmodernism 5: Athens and Jerusalem on the Polis.” Nine speakers will be at Villanova U., Philadelphia, PA. Call (610) 519-9887 or visit [www.villanova.edu/ReligionAndPostmodernism](http://www.villanova.edu/ReligionAndPostmodernism)
- Oct. 27–28.** “Creation, Resurrection, and Eschatology,” Messiah C., Grantham, PA. Sponsors: ASA and Central PA Forum for Religion & Science. Speakers: John Polkinghorne, Fellow of the Royal Society, former prof. of mathematical physics at Cambridge, recipient of the Templeton Prize for Progress in Religion; and Luke Timothy Johnson, Robert W. Woodruff Distinguished Professor of New Testament and Christian Origins in Candler School of Theology at Emory U. and author of more than 20 books, including *The Real Jesus: The Misguided Quest for the Historical Jesus and the Truth of the Historical Gospels*. Details at [www.messiah.edu/godandscience](http://www.messiah.edu/godandscience)
- Oct. 27–28.** Casagrande Interfaith Institute, “Water: A Blessing in Crisis.” Wisdom House Retreat and Conference Center, Litchfield, CT. Presenters from the Christian, Hindu, Jewish, and Muslim traditions will speak on the topic of “water” from their spiritual perspectives. Contact Rosemarie at (860) 567-3163 or Email [rg@wisdomhouse.org](mailto:rg@wisdomhouse.org)
- Nov. 3.** “Chemical Self-Organization, Complexification and Process Metaphysics,” Washington Theological Consortium, Washington, DC. Speaker: James Salmon, S.J. Details from [wimmer@wtu.edu\\_joseph\\_wimmer](mailto:wimmer@wtu.edu_joseph_wimmer)
- Nov. 9–11.** The Redemption of Reason Conference, U. Chicago. “A Conference for International Christian Scholars in conversation with the Sciences and Scientists Today.” Speakers: **Henry F. Schaefer III**, **Ian Hutchinson**, Alvin Plantinga, and Ard Louis. Details at [www.redeemingreason.org/2006/index.html](http://www.redeemingreason.org/2006/index.html)

## Acknowledgment

Photos by Paul Stoub of Stoub Graphics and **Hessel Bouma III**.

## Newsletter Disclaimer

As a newsletter, this publication presents news spanning a spectrum of activities, reports, and publications in order to keep readers abreast of a variety of events and views. Just as newspapers report statements made by people of various viewpoints and opinions without endorsing them, inclusion in this newsletter does not constitute or imply official ASA endorsement.

## Welcome New Members! June–July, 2006

Allen, Douglas –Sioux Center, IA  
Brierty, Robert –Niceville, FL  
Burton, Mark –Albuquerque, NM  
Cho, Grace –Wheaton, IL  
Compton, Robert –Minneapolis, MN  
Coy, Jennifer –Rensselaer, IN  
Davis, Cynthia –Churchville, NY  
DeGrassie, John –Lakewood, CA  
Dudt, Jan –Grove City, PA  
Falloon, Trevor –Hobart, Tasmania, Australia  
Felker, David –Brookfield, WI  
Graas, Alan –Oakhurst, CA  
Gregory, James –Monument, CO  
Hastbacka, Mildred –Needham, MA  
Headley, Jennifer –Grand Rapids, MI  
Isaac, Bryan –Granyer, IN  
Jordan, William –Waco, TX  
Joswig, Amanda –Cedarville, OH  
Kamp, Jacquelyn –Tinley Park, IL  
Kindschi, Douglas –Hudsonville, MI  
Kooiman, Heather –Sioux Center, IA  
Lee, Sun-Yong –Arden Hills, MN  
Lohse, Andrew –Grand Rapids, MI  
Macauley, Shawn –Bartlesville, OK  
Mann, Deborah –Lafayette, IN  
Meissner, Spring –Lancaster, WI  
Mobach, Janina –Edmonton, AB Canada  
Oliai, Samuel –Amsterdam, Netherlands  
Rekman, Janelle –Grand Rapids, MI  
Robey, Thomas –Seattle, WA  
Rouse, Johnny –Winterville, NC  
Stehouwer, Nathan –Grand Rapids, MI  
Stevenson, Charles –Stow, MA  
Stutz, Matthew –Sioux Center, IA  
Venketeswaran, Esther –Beamsville, ON Canada  
Viss, Engela –Mission, KS  
Yuly, Mark –Houghton, NY

## The Genomic Guitarist



After his plenary lecture, **Francis Collins** brought out his guitar and accompanied the audience singing this hymn.

## Praise the Source of Faith and Learning

*Sung to the tune "Hyfrydol"*

Praise the source of faith and learning  
that has sparked and stoked the mind  
with a passion for discerning  
how the world has been designed.

Let the sense of wonder flowing  
from the wonders we survey  
keep our faith forever growing  
and renew our need to pray.

God of wisdom, we acknowledge  
that our science and our art  
and the breadth of human knowledge  
only partial truth impart.

Far beyond our calculation  
lies a depth we cannot sound  
where your purpose for creation  
and the pulse of life are found.

As two currents in a river  
fight each other's undertow  
till converging they deliver  
one coherent steady flow,  
blend, O God, our faith and learning  
till they carve a single course,  
till they join as one, returning  
praise and thanks to you,  
their Source.

Words by Thomas Troeger  
From *Borrowed Light*  
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### Future ASA Annual Meetings

August 2–5, 2007:  
University of Edinburgh, Scotland

August 1–4, 2008  
George Fox University, Newberg, OR

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