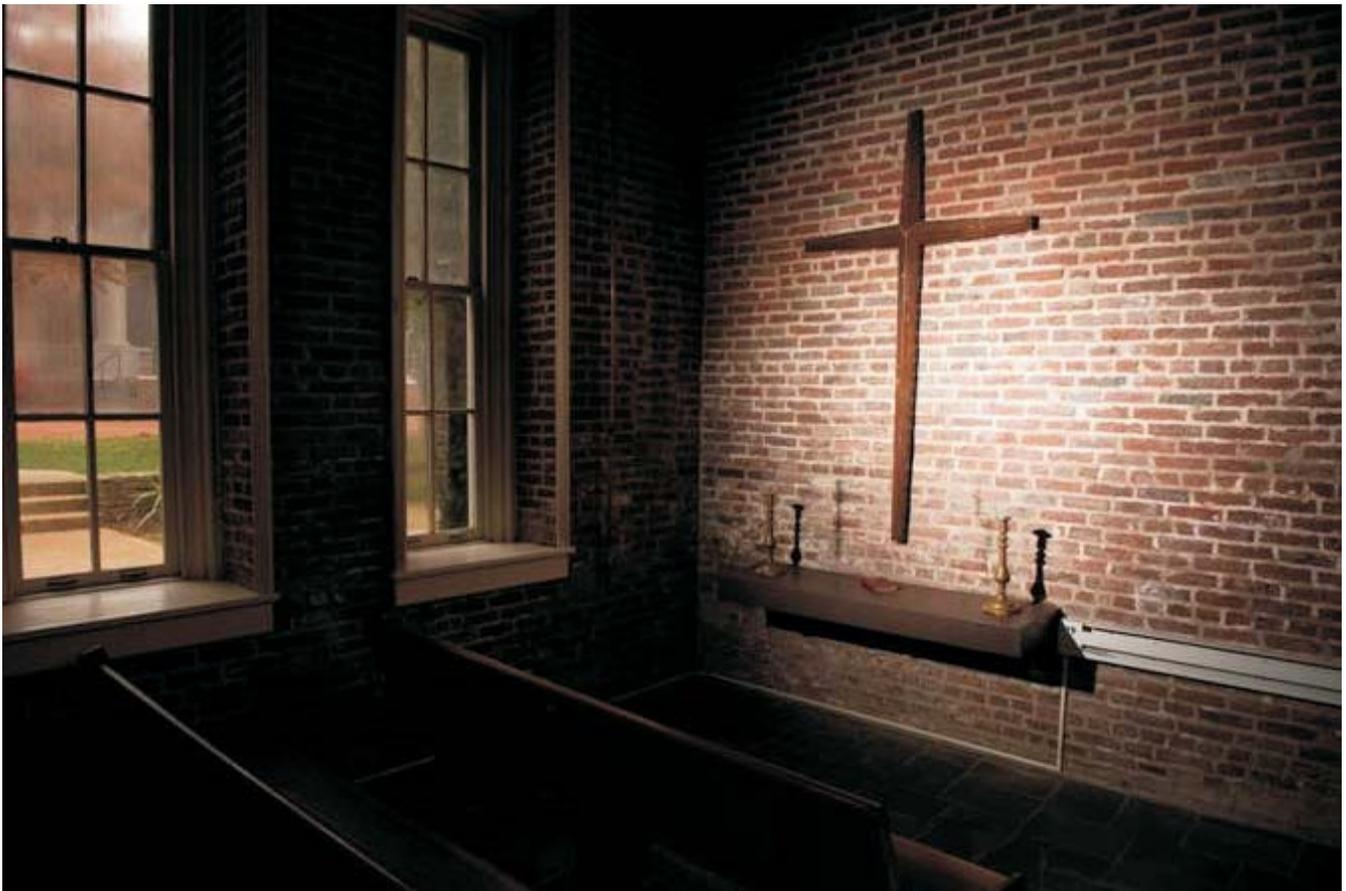




The 68th Annual Meeting of the American Scientific Affiliation

In God's Image: Celebrating Creativity in Science and Invention



*"You made them rulers over the works of your hands;
you put everything under their feet." —Psalm 8:6, NIV*

July 19–July 22, 2013

Belmont University
1900 Belmont Blvd.
Nashville, TN 37212

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General Information

ASA Book Table

We thank Louise Jackson of Cokesbury for providing this service for us. Book tables featuring books of interest to attendees will be in the Baskin Center during the following hours:

Saturday: 9:45 AM – 4:45 PM
Sunday: 2:45 PM – 4:45 PM
Monday: 10:00 AM–12:00 PM

Campus ATM Machine

This is located in the lower level of the Gabhart Student Center.

Corner Court

A campus store where you can purchase snacks, sandwiches, and beverages is open during the following hours:

Monday–Friday: 7:00 AM–3:00 PM

Circle K Convenience Store

Open weekends, this store is located on Belmont Blvd.

Belmont Contact Numbers

Campus Security (non-emergency): 615-460-6617
Campus Security (emergency only): 615-460-6911

Plenary Sessions

All plenary sessions will be held in the Neely Dining Room.

Friday:	7:30 PM	Jeff Cornwall, "Entrepreneurs as Stewards"
Saturday:	8:45 AM	Mary Wagner, "Taking the Road Less Traveled: Building Bones for Christ"
	1:15 PM	James Van Dam, "Faith, Fusion Energy, and Federal Service"
Sunday:	11:00 AM	Andrew Bocarsly, "A Chemist's View on Interacting with God's Creation on Campus and in the Business World: Carbon Dioxide, a Problem and an Opportunity"
Monday:	8:45 AM	Bruce Vojak, "The Love of Innovation: Toward a Theology of Breakthrough Corporate Innovation"

Special Events

Friday:	9:00 AM	Workshop 1: Introductory Hermeneutical Principles for Science and Religion
	1:00 PM	Workshop 2: The Human Genome as an Ancient Text
	9:00 PM	Fellowship Mixer
Saturday:	5:30 PM	Banquet: Ming Wang, "Faith and Science: Friends or Foes?"
	8:00 PM	Student and Early Career Session: Meet the Plenary Speakers
	8:00 PM	Christian Women in Science / STEM
	9:00 PM	InterVarsity Reception
Sunday:	9:30 AM	Worship Service
	7:00 PM	ASA Business Meeting
	8:00 PM	Communications Meeting

Many thanks to ...

Program Chair **Robert Kaita** and Local Arrangements Chair **Todd Lake**.

We are especially thankful for the **donors** who contributed to the Students and Early Career Scientists' Scholarship Fund.

The ASA Spirit

The American Scientific Affiliation encourages thoughtful and provocative scientific presentations and discussions. Presenters and discussants are expected to maintain a humble and loving attitude toward individuals who have a different opinion.

2013 ASA Schedule

Thursday, 18 July 2013—Tuesday, 23 July 2013	
7:00 AM–11:00 PM	Lodging check in at Potter lobby. Pick up your linen packet. If you are arriving later, call before 11 pm.
7:00 AM–12:00 PM	Lodging check out no later than Noon Tuesday. Bring linens packed in the pillowcase to the lobby. Lost room keys are \$75; lost access cards, \$25; lost pouch, \$10, payable immediately to Belmont University.

Thursday, 18 July 2013	
3:00 PM–9:00 PM	ASA meeting registration, Potter lobby

- Abstracts for each session are listed on the pages noted in parentheses.

Friday, 19 July 2013	
7:00 AM–8:00 AM	Breakfast –All meals except the banquet are served in the Gabhart Student Center dining hall.
8:15 AM–9:00 PM	ASA meeting registration, Potter lobby
8:15 AM–4:30 PM	Mammoth Cave National Park field trip –depart from Circle Dr., corner of Acklen Ave. and Belmont Blvd.
9:45 AM	Belmont Mansion field trip –depart from Circle Dr., corner of Acklen Ave. and Belmont Blvd.
9:00 AM–12:00 PM	Workshop 1: Introductory Hermeneutical Principles for Science and Religion – Denis Lamoureux , leader; Baskin 144
12:00 PM–1:00 PM	Lunch, Gabhart Student Center
12:45 PM–4:30 PM	Discover Nashville field trip –depart from Circle Dr., corner of Acklen Ave. and Belmont Blvd.
1:30 PM–4:30 PM	Workshop 2: The Human Genome as an Ancient Text – Dennis Venema , leader; Baskin 144
5:30 PM–6:15 PM*	Dinner, Gabhart Student Center * Another large group is sharing the cafeteria beginning at 5:00 PM. Many will have left or be soon leaving, if we arrive at 5:30 PM. We can stay in the cafeteria longer, but the food is available only to 6:15 PM.
7:00 PM	Welcome and Introductions, Neely Dining Room <ul style="list-style-type: none"> • Randy Isaac, ASA Executive Director • Thomas Burns, Provost, Belmont University • Todd Lake, Local Arrangements Chair • Robert Kaita, Program Chair
7:30 PM Plenary Session	Session I.A. Neely Dining Room Moderator: Todd Lake Jeff Cornwall , “Entrepreneurs as Stewards” (6)
9:00 PM	Fellowship Mixer , Black-and-White Room off the Neely Dining Room

- Abstracts for each session are listed on the pages noted in parentheses.

Saturday, 20 July 2013			
7:00 AM	Breakfast, Gabhart Student Center		
8:15 AM	Devotions: Francis Su –Neely Dining Room		
8:45 AM Plenary Session	Session II.A. Neely Dining Room Moderator: Robert Kaita Mary Wagner , “Taking the Road Less Traveled: Building Bones for Christ” (6)		
10:00 AM	Beverage Break, lobby of the Baskin Center		
Oral Session II	II.B. Appropriate Technology and Stewardship –Baskin 144 (9) Moderator: Ruth Douglas Miller	II.C. Science and Faith: History, Philosophy, and Theology –Baskin 157 (17) Moderator: William Nettles	II.D. Genetics, Paleobiology, and the History of Life –Baskin 249 (13–14) Moderator: Keith Miller
10:30 AM	Terry Gray “Feeling the Heat—Globally”	Dominic Halsmer “What Hath Stuttgart to do with Jerusalem? Exploring a Model of God as Engineer”	David Campbell “A Brief History of Slime: 550 Million Years of Mollusks”
11:00 AM	John Greenplate “High-Tech Crops and Low-Tech Farming: Small-Holder Benefits from Adoption of Insect-Protected Biotech Cotton in West Africa”	Peter Hess “Evolving into the Image of God”	Loren Haarsma “Models of Evolving Interlocking Complexity in Biology and Economics”
11:30 AM	William Jordan “Christian Humanitarian Engineering”	George Murphy “The Real Presence of Christ in the Real World”	Ralph Stearley “Metaphoric Lexical-Semantic Capacity in the Erection of a Cognitive Platform for Humanity during the Paleolithic”
12:00 PM	Lunch, Gabhart Student Center		
1:15 PM Plenary Session	Session III.A. Neely Dining Room Moderator: Robert Kaita James Van Dam , “Faith, Fusion Energy, and Federal Service” (7)		
2:30 PM	Refreshment Break, lobby of the Baskin Center		
Oral Session III	III.B. Physical Sciences: Recent Advances and Implications –Baskin 144 (15) Moderator: Phill Broussard	III.C. Science and Faith: History, Philosophy, and Theology (cont'd) –Baskin 157 (17–18) Moderator: Terry Morrison	III.D. Communicating Science and Faith in the Classroom, Church, and the Media –Baskin 249 (11) Moderator: Stephen Contakes
3:00 PM	Matthew Huddleston “The Challenge of the 4th Dimension in Modern Physics and Biblical Orthodoxy”	Steve Robinson “Dealing with Natural Selection in Scripture”	Paul Arveson “Exaggerations and the Troubles They Cause”
3:30 PM	Clarence Menninga “Inventiveness in Portraying God’s Handiwork”	Mark Shelhamer “Can We Really Know Anything at All?”	Stephen Contakes “Atomic-Molecular Theory: An Opportunity for Exploring the Foundations of Science and Religion Dialogue in the Undergraduate Chemistry Curriculum”
4:00 PM	Arnold Sikkema “Emergence in Physics: Signposts of Creativity”	Scott Symington “Cameras of the Watchman: The Real Relationship between Science and Religion”	Tony Jelsma and Jeff Ploegstra “Global Problem Solving: Using an Interdisciplinary Approach to Engage Students in Addressing Global Problems”
5:30 PM	Banquet , Maddox Grand Atrium —Seating begins at 5:15 PM Ming Wang , “Faith and Science: Friends or Foes?” (8) Music: Ming Wang on the er-hu, a Chinese two-stringed instrument, accompanied by guitarist and composer Carlos Enrique		

Saturday, 20 July 2013	
8:00 PM	Christian Women in Science / STEM (science, technology, engineering, math), Lynn Billman , presiding –Massey Board Room
8:00 PM	Students and Early Career Meet the Plenary Speakers –Neely Dining Room Alcove
9:00 PM	InterVarsity Reception , Dwight Schwartz and Terry Morrison , hosts –Black-and-White Room off the Neely Dining Room

Students and Early Career Meet the Plenary Speakers

Students and early career attendees are invited to meet some of the plenary speakers, Saturday at 8:00 PM in the Neely Dining Room Alcove. Our speakers have a variety of backgrounds and represent a range of disciplines. Please join us for some refreshments in this opportunity to engage them in an informal setting.

—Robert Kaita and David Buller

InterVarsity Reception

InterVarsity (IV) Grad Student and Faculty Fellowships invite you to a reception, Saturday at 9:00 PM, in the Black-and-White Room off the Neely Dining Room. A few ASA folk with fond memories of their IV grad student days (Jennifer Wiseman and Robert Kaita, for example) will share briefly. We'll tell you what's happening in our movement these days and try to answer any questions you have.

Of course, there will be food and drink available, lots of IV propaganda, and us—the IV staff. Dwight Schwartz and I are the official hosts, but a number of grad IV staff from nearby Nashville and other campuses will join us. Lots to learn, some ways to get engaged, and a great way to end the day!

—Terry Morrison

- Abstracts for each session are listed on the pages noted in parentheses.

Sunday, 21 July 2013	
7:00 AM	Breakfast, Gabhart Student Center
9:30 AM	Session IV.A. Worship Service , Neely Dining Room Minister: Todd Lake
10:30 AM	Beverage Break, Black-and-White Room off the Neely Dining Room
10:45 AM Poster Session	Session IV.B. Poster Presentations –Neely Dining Room (15–17) ♦ Scott Bonham , “Creative Light in Introductory Physics” ♦ Alan Dickin , “Creation in God’s Image: Implications for Science and Faith” ♦ Glenn Jones , “Dueling Scientists and Dueling Historians: Controversy over the External History of Germ Theory” ♦ Craig Story and Justin Topp , “Promoting Scientific Literacy in Pastors” ♦ Michael Tope , “Faith and Non-Zero-Sum Game Theory”
12:00 PM	Lunch, Gabhart Student Center
1:30 PM Plenary Session	Session V.A. Neely Dining Room (7) Moderator: Robert Kaita Andrew Bocarsly , “A Chemist’s View on Interacting with God’s Creation on Campus and in the Business World: Carbon Dioxide, a Problem and an Opportunity”
2:45 PM	Refreshment Break, lobby of the Baskin Center

Sunday, 21 July 2013			
Oral Session V	V.B. Appropriate Technology and Stewardship (<i>cont'd</i>) –Baskin 144 (10) Moderator: William Jordan	V.C. Genetics, Paleobiology, and the History of Life (<i>cont'd</i>) –Baskin 157 (14–15) Moderator: David Campbell	V.D. Communicating Science and Faith in the Classroom, Church, and the Media (<i>cont'd</i>) –Baskin 249 (12) Moderator: David Vosburg
3:15 PM	Susan Mabry “Digital Stumbling Blocks for Faith and Spirituality”	Keith Miller “The Fossil Record and the Cambrian ‘Explosion’: An Update”	Francis Su “Lessons from ‘The Lesson of Grace in Teaching’”
3:45 PM	Ruth Douglas Miller “Our Electricity Future”	David Wilcox “Updated Notes on Genetic Prehistory”	Kathleen Tallman “Faith Integration in the Context of an Undergraduate Cadaver Lab”
4:15 PM	Martin Price “Using Science to Help the Extremely Poor”	V.E. Faith and Ethics in Biomedical Science –Baskin 157 (13) Moderator: Tony Jelsma	David Vosburg “Catalyzing Compatibility of Evolution and Christian Faith”
		Jay Hollman “Medical Ethics and Health Care Reform”	
5:00 PM	Dinner, Gabhart Student Center		
7:00 PM	ASA Business Meeting –Neely Dining Room		
8:00 PM	Communications Meeting, Emily Ruppel , presiding –Neely Dining Room		

- Abstracts for each session are listed on the pages noted in parentheses.

Monday, 22 July 2013			
7:00 AM	Breakfast, Gabhart Student Center		
8:15 AM	Devotions: Arnold Sikkema –Neely Dining Room		
8:45 AM Plenary Session	Session VI.A. Neely Dining Room Moderator: Randy Isaac (8) Bruce Vojak , “The Love of Innovation: Toward a Theology of Breakthrough Corporate Innovation”		
10:00 AM	Beverage Break, lobby of the Baskin Center		
Oral Session VI	VI.B. Appropriate Technology and Stewardship (<i>cont'd</i>) –Baskin 144 (10–11) Moderator: Martin Price	VI.C. Science and Faith: History, Philosophy, and Theology (<i>cont'd</i>) –Baskin 157 (18–19) Moderator: Terry Morrison	VI.D. Communicating Science and Faith in the Classroom, Church, and the Media (<i>cont'd</i>) –Baskin 249 (12–13) Moderator: Robert Kaita
10:30 AM	Joshua Weed “Natural Fiber Reinforced Composites: A Means to Ascribe Global Economic Value to Unique Renewable Resources in Developing Countries”	Lanny Vincent “Awe and Wonder: A Biblical Nudge to Scientists and Engineers When Innovating”	Denis Lamoureux “The Flip (Blended) Classroom for Science and Religion: Some Preliminary Observations”
11:00 AM		Ray Williams “The ‘Image of God’: Its Scriptural Setting”	John Staver “Examining Hoosier Legislators’ Continuing Attempts to Legislate Teaching Religion in Science Class with Four Lenses: Science, Religion, Law, and Truth”
11:30 AM		David Winyard “Creativity and Transhumanism: Where Are the Limits?”	David Saunders “Parallel Standards for Disclosing Inventions and Disclosing the Gospel”
12:00 PM	Lunch, Gabhart Student Center		
	ASA check out. All meal cards must be returned; otherwise you will be charged \$10.		

Plenary Session Abstracts

PLENARY SESSIONS

Friday, 19 July 2013

7:30 PM

Entrepreneurs as Stewards

Jeff Cornwall

The entrepreneur has to discern the most effective *means* for attaining the firm's morally good *ends* in light of his particular and unique *circumstances*. Each of us, made in the image of God, have been given a command to have dominion, to "make" something (Gen. 1:26).

Entrepreneurs, in particular, are by nature builders and makers of things. To start and grow a business, the entrepreneur develops the necessary business skills needed to transform the resources secured by various stakeholders, raw materials, labor, money, etc., into useful products and services. However important the means are to entrepreneurship, and they are very important, they have to be directed not simply to any old end, but to *good ends* if the entrepreneur is to develop the enterprise into a community of work where people flourish.

Our call to have dominion over the earth does not mean exploitation or domination, but a way in which we do our work. And however important the relationship between means and ends are, they do not tell us precisely what to do in particular circumstances. The ends and the means will orient the entrepreneur in a particular direction, but they do not always tell him or her in precise terms what he or she should practically do in this situation at this time.

Every entrepreneur encounters obstacles along the way. Without a realistic perception of the business situation he or she is in, the entrepreneur will be like the captain of a warship telling the lighthouse to get out of the way.



Jeff Cornwall is the inaugural recipient of the Jack C. Massey Chair in Entrepreneurship and professor of entrepreneurship at Belmont University in Nashville, Tennessee.

He has a doctorate in business administration and an MBA from the University of Kentucky.

In the late 1980s, Cornwall left academics for a nine-year "sabbatical" to become the cofounder and president/CEO of Atlantic Behavioral Health Systems, headquartered in Raleigh, NC.

Cornwall has received national awards for his work in curriculum development and teaching, and in 2013 he was named the National Entrepreneurship Educator of the Year by the United States Association of Small Business and Entrepreneurship.

He has published eight books and numerous articles on entrepreneurship. His blog, *The Entrepreneurial Mind*, is among the most popular with a focus on small business and entrepreneurship.

The Entrepreneurial Mind is part of the *Forbes* blog network and was named by that magazine as a "Best of the Web." It is also syndicated by *The Christian Science Monitor* and many other outlets. He also writes a bi-weekly column for the *Tennessean* on small business.

Saturday, 20 July 2013

8:45 AM

Taking the Road Less Traveled: Building Bones for Christ

Mary Wagner

We often stay in one place because it is comfortable, and we feel content with the status quo. However, often God asks us to step out of our comfort zone in order to accomplish something for the kingdom.

If you step out in faith, God will provide what you need, and you will likely feel his blessings. Sometimes we have a career path in mind and try to direct the GPS to take us down a road we think is best. If we listen to God, however, and let him be our GPS, we may be surprised at the journey he will take us along. When the road gets difficult, we may panic and take our eyes off Jesus. This is going to minimize the outcome.

This presentation will describe how my faith is helping me shift my research from neurology to public health and what I have learned in the process. I will also present my research related to public health issues concerning bone loss and falls.



Mary Wagner obtained her Doctor of Pharmacy degree from the University of California in San Francisco and a Masters degree in pharmacotherapy research at the University of Minnesota where she also

completed an epilepsy fellowship. She completed a general pharmacy residency at the University of Arizona in Tucson and a specialized ambulatory care residency at the University of Texas in San Antonio.

Wagner joined the faculty at Rutgers in 1990. As a pharmacy professor, she teaches the neurology-related topics in the curriculum and precepts students and pharmacy residents in the neurology clinic at Robert Wood Johnson University Hospital. As clinical pharmacists, she and her students work with neurologists to evaluate and monitor patients with a variety of neurological conditions. Her specific expertise is in patients with epilepsy, Parkinson's disease, sleep disorders, and headaches.

She is the adviser for the Clinical Pharmacy Honor's Research program and has completed multiple clinical research projects, producing over sixty manuscripts and seventeen chapters in pharmacy textbooks.

She currently is working on several projects to identify patients at risk for osteoporosis and to develop treatments for preventative care. She is also working on grants for tele-pharmacy and multidisciplinary health care teams for federally qualified health care centers.

Wagner serves on the International Medical Advisory Board for the Restless Legs Syndrome Foundation, the Interagency Council on Osteoporosis for the New Jersey State Board of Health, and chairs the neurology section on the *Annals of Pharmacotherapy* Editorial Advisory Board.

The activities of her two teenage children keep her busy. She also enjoys teaching Sunday school, Bible studies, traveling, and reading about nutritional effects on health.

Saturday, 20 July 2013

1:15 PM

Faith, Fusion Energy, and Federal Service

James Van Dam

Fusion energy holds the promise of benefitting society as a new source of baseline power in the second half of the twenty-first century. Federal service can be an arena in which Christians contribute significantly.

This talk will discuss both topics based on personal experience, interwoven with a testimony of faith in Jesus Christ and service in the church.



James Van Dam is the Fusion Energy Sciences Research Division Director in the Office of Science of the US Department of Energy. He was a visiting member of the Institute for Advanced Study in Princeton for one year

and then moved with Prof. Marshall Rosenbluth to the University of Texas at Austin when the Institute for Fusion Studies was established in 1980. He served as the director of the Institute during 2003–2011. Concurrently, he was the director of the US Burning Plasma Organization and the Chief Scientist of the US ITER Project Office during 2007–2011.

His research areas include kinetic theory, MHD, plasma waves, ignition physics, equilibrium and stability in toroidal confinement fusion devices, energetic particles, and magnetospheric physics. He has published over one hundred papers and two books. He has organized a number of international workshops. He was a member of the program advisory committees for DIII-D, Alcator C-Mod, Fusion Simulation Program, National Institute for Fusion Science (Japan), and Max-Planck Institute for Plasma Physics (Germany). He was the co-chair of the US-Japan Joint Institute for Fusion Theory. He was the chair of the US Theory Coordinating Committee. He is a Fellow of the American Physical Society (1992). He continues to serve as a US member of the Science and Technology Advisory Committee for the international ITER Project.

He has been a ruling elder and a Sunday school teacher for more than thirty-five years in the Christian Reformed Church and in two congregations of the Orthodox Presbyterian Church.

Sunday, 23 July 2013

1:30 PM

A Chemist's View on Interacting with God's Creation on Campus and in the Business World: Carbon Dioxide, a Problem and an Opportunity

Andrew Bocarsly

Though the Bible states that the Lord gave us dominion over the whole of the earth, we are left to our own creativity in determining how to exercise this power. This endeavor takes great knowledge and understanding. For example, we struggle to understand how the burning of fossil fuels, thereby generating carbon dioxide, may affect our climate. We also wonder how our increasing appetite for energy can be met in the future, and whether it is possible to satisfy our human desire for more energy without irreversibly harming God's creation.

My research group at Princeton considers these questions from a chemical point of view. We asked the question: can one take waste carbon dioxide and convert it back to a fuel using sunlight and water? We started to answer this question with the chance observation that the organic compound, pyridinium, was particularly successful at shuttling electrons from an electrode to carbon dioxide. This is the first critical step in what one might call "reverse combustion."

Following up on this idea, we learned how to convert carbon dioxide and water into methanol, a fuel, using an electrochemical cell with a pyridinium catalyst to do the conversion without consuming an excessive amount of energy. We then selected a semiconductor that would convert sunlight into electrons as the electrode in our electrochemical cell. At this point, the first baby steps of the science were in place.

But how did this chemistry work at the level of truly understanding it and controlling it? And, if one could exercise exquisite control over this reaction, could it be used to protect our atmosphere while providing fuel? While the first question falls in the realm of chemistry, the latter is outside my abilities as a chemist, but not

outside my interest as a member of society that wishes to heed God's Word.

The full answer to this question is still unknown, but a group of investors saw our work, and together we decided to see if our science provided a pragmatic solution to this problem. Hence, the birth of Liquid Light Inc., a startup company that is attempting to move our laboratory experiments into the marketplace.

Will it work? We will see.



Andrew Bocarsly received his BS degree jointly in chemistry and physics from UCLA in 1976, and his PhD in chemistry from MIT in 1980. He has been a member of the Princeton University chemistry department faculty for thirty-three years. He is

affiliated with Princeton's Materials Institute, Princeton's Environmental Institute, and the Andlinger Center for Energy and the Environment.

Bocarsly has published over 190 papers in peer-reviewed journals and co-authored over a dozen patents. Research in his laboratory is focused on visible light photoelectrochemistry for the conversion of carbon dioxide to alcohols, elevated temperature proton exchange membrane fuel cells, cyanogel sol-gel processing, and molecule-based multielectron photoinduced charge transfer processes.

Bocarsly serves as a consultant and contractor to various fuel cell and alternate energy companies. He is a co-founder and president of the Science Advisory Board for Liquid Light Inc., a company formed to commercialize the formation of organic commodity chemicals from carbon dioxide using alternate energy sources.

Bocarsly has received an Alfred P. Sloan Fellowship, the Sigma Xi (Princeton Section) Science Educator Award, and the American Chemical Society-Exxon Solid State Chemistry award. He serves as the electrochemistry editor for *Methods in Materials Research*. He has also edited a volume for *Structure and Bonding* in the area of fuel cells and batteries and sits on the Advisory Board for the *Journal of Physical Chemistry, C*.

Monday, 22 July 2013

8:45 AM

**The Love of Innovation:
Toward a Theology of Breakthrough
Corporate Innovation**

Bruce Vojak

As engineers and scientists called to careers in industry, how might we reconcile our Christian faith with a vocation to create innovative new products and processes? How might this faith inform how to appropriately and meaningfully approach this work on a daily basis? Further, how might such reflection provide all believers with a deeper and richer understanding of the important role that gifted innovators play in industry?

Building on personal experience, research, and reflection, I will compare and contrast the Gospel of Jesus Christ with the pervasive, yet unarticulated "Gospel of innovation" – hope in the face of despair in which innovative products "save" customers from the effects of the Fall, innovation processes "save" companies and investors from financial ruin, and innovation careers "save" employees from a mundane existence. Following a review of our research findings in which we studied the behaviors of exemplary breakthrough innovators in large, mature firms, I will explore

- the purpose of innovation and of innovative products and processes,
- the innovator's perspective and posture, and
- how innovation plays out in the arc of history.

Such reflection can help us grasp insights that are inaccessible to modern approaches to understanding and advancing corporate innovation, and begin to address the questions posed at the beginning of this abstract.



Bruce Vojak is an associate dean and an adjunct professor in the College of Engineering at the University of Illinois at Urbana-Champaign. Prior to joining the university in 1999, he was Director of Advanced

Technology for Motorola's nonsemiconductor components business; earlier he held business development and research positions at Amoco and a research position at MIT Lincoln Laboratory.

In addition to his administrative responsibilities, he teaches and conducts research on the topics of innovation and strategic technology management.

With Abbie Griffin and Ray Price, he is co-author of *Serial Innovators: How Individuals Create and Deliver Breakthrough Innovations in Mature Firms* (Palo Alto, CA: Stanford University Press, 2012). Further, he currently serves on the Board of Directors of Midtronics, Inc. and periodically consults for Procter & Gamble.

Bruce holds BS, MS, and PhD degrees in electrical engineering from the University of Illinois at Urbana-Champaign and an MBA, with concentrations in finance and marketing, from the University of Chicago's Booth School of Business.

BANQUET SPEAKER

Saturday, 20 July 2013

6:30 PM

Faith and Science: Friends or Foes?
Ming Wang

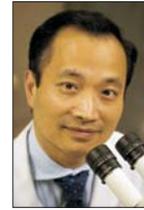
Ming Wang will describe his experience growing up in China during the Cultural Revolution (1966–1976). At age 14, after graduating from junior high school, Ming faced the deportation imposed by the Communist government to the poorest part of China, being condemned to a life of poverty and hard labor, a devastating fate that fell upon millions of youth in China during that time. Ming learned to play the Chinese violin er-hu as a way to escape deportation.

A chance meeting with a visiting American professor helped Ming. In 1982, with \$50 in his pocket, a Chinese-English dictionary in his hand, and with an American dream in his heart, Ming arrived in the US.

Wang will tell the powerful story of the development of an amniotic membrane contact lens, a 16-year journey of faith and science. He will describe how he began the fetal wound-healing research to try to help injured adult eyes heal and to restore sight, but he was frustrated at not being able to find a way to conduct the fetal tissue research without hurting a fetus.

Should we conduct fetal tissue research without our moral, ethical, and faith principles? Or should we not conduct such research and hence not advance

medicine and improve the quality of our lives? Is science and faith really this contradictory? What does God want us to do?



Ming Wang, a Harvard and MIT graduate (MD, *magna cum laude*) and one of the few cataract and LASIK surgeons in the world today who holds a doctorate degree in laser physics, is the only surgeon in Tennessee who performs 3D LASIK (18–60 yr olds), 3D Forever Young Lens

surgery (40–65 yr olds), and 3D laser cataract surgery (60+ yr olds). He has performed over 55,000 procedures, including procedures on over 4,000 doctors.

Wang has published six textbooks and a paper in the world-renowned journal *Nature*. He holds several US patents and has founded two 501(c)(3) nonprofit organizations, Wang Foundation for Christian Outreach to China and Wang Foundation for Sight Restoration, which to date has helped patients from over forty states and 55 countries by funding all sight restoration surgeries.

Wang Vision 3D Cataract & LASIK Center:
www.wangcataractLASIK.com

Wang Foundation for Christian Outreach to China and Wang Foundation for Sight Restoration:
www.wangfoundation.com

Oral and Poster Session Abstracts

APPROPRIATE TECHNOLOGY AND STEWARDSHIP

Saturday, 20 July 2013 10:30 AM

Feeling the Heat—Globally Terry Gray

Energy powers human society. Heating, cooling, energy for agriculture and food preparation, fuel for transportation, energy to power manufacturing, electricity for lighting and computer technology—these are all in high demand in almost every corner of our interconnected world.

We will survey recent global energy consumption statistics to get a sense of where the world is. For example, the global energy use in 2011 was 540 EJ for a population of 7 billion. That is 77 GJ/person.

- How does energy use partition out by country?
- How does per capita energy use partition out by country?
- How is energy use related to economic development?
- How does energy use in different sectors (transportation, industry, commercial, residential) differ depending on economic development?
- How is a Christian to think about these issues?
- Are there global justice issues to consider?
- How does this relate to global warming, climate change, and creation care?
- How do renewable/alternative energy sources come into play?
- Should we be optimistic or pessimistic about the future of energy and its effect on the earth's climate?

This overview is based on lectures from the Chemistry in Context course for nonscience majors at Colorado State University.

Saturday, 20 July 2013 11:00 AM

High-Tech Crops and Low-Tech Farming: Small-Holder Benefits from Adoption of Insect-Protected Biotech Cotton in West Africa John Greenplate

This presentation describes—from research to sales—the most successful commercial introduction of an agricultural biotech product in Africa. From field studies beginning in 2003 in Burkina Faso to broad commercial release in 2009, a wide collection of stakeholders worked together to build local capacity on several fronts (technical, regulatory, business) simultaneously to enable the release of insect-protection biotech traits in several locally favored cotton varieties.

The genetic modifications introduced (insect-specific toxins from the soil bacterium *Bacillus thuringiensis*) have provided protection from key economic caterpillar pests of cotton, Burkina Faso's major source of export earnings and income producer for hundreds of thousands of small farmers. Three years of socio-economic assessments have determined that the technology has raised local cotton yields by approximately 20%, reduced pesticide inputs by 70%, and provided economic gains to local growers of approximately 60%.

In addition to the environmental benefits realized, the reduction of harsh insecticide inputs has also significantly limited exposure to farmers, for whom accidental insecticide poisonings are, unfortunately, quite common. Stakeholders continue to cooperate in several ongoing stewardship efforts to prolong the value of this technology and to improve lives in one the world's poorest regions.

Saturday, 20 July 2013 11:30 AM

Christian Humanitarian Engineering William Jordan

In their excellent small book, *Humanitarian Engineering*, Carl Mitcham and David Munoz develop humanitarian engineering as a separate engineering discipline. To do this, they draw on the history of engineering and the history of the humanitarian movement. As many young engineers are increasingly motivated to use engineering to directly help poor and underserved populations, this is a concept that is growing. Some schools, such as the Colorado School of Mines, now offer humanitarian engineering as a minor.

This concept resonates with Christian engineering educators. Many of us have tried to develop the concept that Christian engineering is much more than engineering done by Christians. We have led engineering service/mission projects in the developing world because we wish to use engineering to directly help poor people.

This presentation will start with the work of Mitcham and Munoz and develop the concept of a Christian humanitarian engineering. This presentation will use insights from H. Richard Niebuhr's book *Christ and Culture*.

How a Christian engineer sees her work depends greatly upon her view of Christian faith and culture. Niebuhr's book presents six different views of Christ and culture. The perspective of Christ transforming culture is the perspective that will be used to further develop this concept of Christian humanitarian engineering. If Christ is to transform culture, then all of culture should be penetrated by Christians who serve him and the world through their work. Christian engineers who seek to help the poor through their engineering work are doing Christian humanitarian engineering.

Sunday, 21 July 2013

3:15 PM

Digital Stumbling Blocks for Faith and Spirituality

Susan Mabry

Computer science permeates nearly every aspect of our lives. This project contemplates dimensions that touch the core of individual being—acceptance of faith, spirituality, and personal communication. Two decades ago, philosopher Borgmann spoke of a second scientific revolution occurring in the form of “a device paradigm.” Forms of digital conversation and social networking are transforming the way we converse and relate to one another. Ubiquitous connectivity has introduced a demanding pace. Despite devotion to faith, relentless pressures amid a frantic pace infringe on spiritual practices. Spirituality in this environment requires steadfast and deliberate choices.

The intersection of computer science and faith poses similarities to the traditional discourse of science and religion; yet issues extend further because of the pervasiveness and immediacy of computing in our daily lifestyles. Within the field of computer science, believers are few. Computing professionals are usually highly intelligent, reliant on their own intellect and on methodical practices. A necessary sense of self-reliance and confidence often affronts the acceptance of faith and the ability to trust and rely on God. This affords a precipice for questioning whether worldviews often held by computer scientists may propagate to a society engulfed in digital technologies.

Do technologies produced by a discipline founded in logical processes, present stumbling blocks for the acceptance of faith? Does pervasive technology distract from spiritual practices? Does prolific use of electronic conversation venues reduce depth of reflection and affect sense of community? These dilemmas both intrigue and perplex computer scientists of faith, as well as the wider body of believers.

Sunday, 21 July 2013

3:45 PM

Our Electricity Future

Ruth Douglas Miller

Everyone has no doubt heard of one or more energy-related phrases in political discourse recently: “renewable energy,” “clean coal,” “fracking,” “all of the above” ... All these topics are dealing, generally in piecemeal and without any overarching planning, with how we generate the electricity that gives us light at night; keeps our food fresh and our water hot; keeps our homes at pleasant temperatures; and runs our computers, phones, and other gadgets that we mostly consider necessary for life in our culture. But how should these ideas fit together? If CO₂ emissions really must be cut in half, how can we do that? What will our lives look like in 20 or 50 years if we do?

In 20 or 50 years, if we are serious about cutting carbon emissions, we should expect to live much more efficiently, cutting our average electricity use by perhaps 30% through the adoption of highly efficient appliances and construction/retrofit of highly efficient buildings. About one-half of our electricity will come from nuclear plants, perhaps 1.5 times as much as today. The remainder will come from wind and solar energy, on all scales. Most houses will be heated and cooled by high-efficiency heat pumps. Natural gas may still heat water in some areas, but solar energy will do a lot of that too. And the changeover—if it begins now—may have cost a few percent more than maintaining the system of 2010.

Sunday, 21 July 2013

4:15 PM

Using Science to Help the Extremely Poor

Martin Price

One of the greatest differences between any in this room and the extremely poor is that we have many options in life while they have very few—and of the options they have, many are not good. Imagine that you have agreed to work with some church or agency for a few years in a remote community of small-holder farmers in a tropical country. The agency has asked you

to identify several low-cost and sustainable new options to offer the community. No matter how much science, business, or even development theory you may have studied, identifying such technologies or techniques that can be introduced with a modest budget can be mystifying.

This talk will give a fast overview of examples that have met these criteria in various climates and settings and will hopefully encourage some to consider further how science can be adapted to help the poor.

- A set of practices called “Farming God’s Way” is giving much higher yields, especially where rainfall is unpredictable.
- Tea made from a Chinese herb that can be grown in the garden in many locations contains the same drug used in the most powerful antimalarial medicines.
- Trees can be “regenerated” in deforested land from sprouts coming from roots of trees that were cleared years ago.
- Bruchid beetle damage to stored beans can be stopped without poisons by rotating the container twice a day for a couple weeks.

Monday, 22 July 2013

10:30 AM

Natural Fiber Reinforced Composites: A Means to Ascribe Global Economic Value to Unique Renewable Resources in Developing Countries

Joshua Weed

Developing countries are often utilized in the global economy for their valuable, depleting natural resources and low-cost labor. These areas of worth are constrictive to the developing country itself, however, since neither lead to a growth of capital or opportunity.

Stewardship of these developing countries’ population and resources, in the fields of sustainable development and appropriate technology, is two-fold. First, the ever-growing trend of humanitarian engineering is to innovate technologies that are specific to a developing country’s culture, environment, and economy. While the daily needs of the poor are met through these technologies, it is

crucial that a step be taken to bring global economic value to the developing country that will provide substantial income for sustained growth. By providing means to ascribe value to their unique renewable resources, especially those currently considered waste products, the poor can emerge in the global economy with not only a valuable asset, but one that allows for steady financial growth.

It is this motivation that has driven research in the use of natural fibers in fiber-reinforced polymer composites. By replacing synthetic fibers, which are used to strengthen polymer composites, with renewable natural fibers, not only will industrial and manufacturing countries benefit from the cheaper and more sustainable alternative, but also the developing countries rich with this resource will find themselves with a new, profitable resource from which to emerge successfully in the global economy.

**COMMUNICATING SCIENCE AND
FAITH IN THE CLASSROOM,
CHURCH, AND THE MEDIA**

Saturday, 20 July 2013

3:00 PM

**Exaggerations and the Troubles
They Cause**

Paul Arveson

There are several conceptual frameworks that have been frequently used to help frame discussions in ASA. One of these is the idea of a dialogical framework, in which two concepts are seen to complement each other and offer a balanced view that helps to identify and moderate exaggerations.

In 1978, I described a "dialogical" structure of 2-dimensional logic in an article in *PSCF* [<http://www.asa3.org/ASA/PSCF/1978/JASA6-78Arveson.html>] that shows how many theological doctrines are framed.

The same structure can be applied to many subjects other than theology, and I will outline steps for recognizing, expanding, and moderating other controversies. This is not a new framework, but it may be helpful to review some of its applications in the context of conflict resolution as we encounter a more polarized culture today.

Saturday, 20 July 2013

3:30 PM

**Atomic-Molecular Theory:
An Opportunity for Exploring
the Foundations of Science and
Religion Dialogue in the
Undergraduate Chemistry
Curriculum**

Stephen Contakes

Science and religion courses commonly use the Galileo affair, Christian "love affair gone wrong" with the Newtonian Clockwork Universe, and Victorian responses to evolution to illustrate the features of science-faith dialogue. In contrast, chemistry's central theoretical paradigm, atomic-molecular theory, is often ignored, since it was relatively uncontroversial in religious circles by the time it found ready acceptance among chemists. However, there is a rich and longstanding dialogue between Christian theology and atomic-molecular ideas that can be used to introduce science-faith topics in chemistry courses.

Although several church fathers condemned atomism due to its long association with the atheism of Epicurus and Lucretius, throughout the medieval period, the church warily tolerated atomic ideas in a salutary attempt to remain open to secular advances and implicit recognition of the danger of God-of-the-gaps reasoning. This enabled a constructive early modern dialogue over atomic ideas in which Christian thinkers carefully intertwined theological and philosophical reflection on atoms with debates about their ontological status. As a result, Pierre Gassendi, Walter Charleton, Robert Boyle, and others were able to philosophically, theologically, and pastorally rehabilitate and popularize atomic ideas.

However, in seeking to dissociate atomism both from pagan naturalist and materialist associations, early modern Christian atomists (contra alchemists) indirectly promoted a sharp dualism between the material and the spiritual in Western thought. Although this dualism was crucial for the development of modern science, it had the potential to degenerate into a crass materialism, particularly when mixed with naive notions of scientific progress.

Saturday, 20 July 2013

4:00 PM

**Global Problem Solving:
Using an Interdisciplinary Approach
to Engage Students in
Addressing Global Problems**

Nathan Tintle, Ryan Brunner, Gary De Vries,
Paul Fessler, Tony Jelsma, Jeff Ploegstra,
and Darren Stoub

At Dordt College, interdisciplinary teaching and learning continue to be core to our mission of developing serviceable insight in students to prepare them for Kingdom service. Interdisciplinary thinking is also promoted nationally as a model educational approach to improve student engagement, critical thinking, creativity, and disciplinary understanding. However, there are serious hurdles to widespread implementation of interdisciplinary approaches, not the least of which are faculty time and traditional educational infrastructure.

We have implemented a pilot learning initiative designed to explore a model of interdisciplinary teaching and learning in a Christian liberal arts institution. While many colleges have courses that are designed to be interdisciplinary, an explicit goal of this project was to involve multiple courses.

Specifically, we organized a cross-course assignment, which was a broadly interdisciplinary conversation with nearly 500 Dordt students and 20+ faculty and courses on the topic, "Water: Essential for Humanity." The project required individual students to act as representatives of the courses they were taking, and as disciplinary experts. This interdisciplinary conversation involved structured student discussions and brainstorming on potential solutions to the global water crisis, poster presentations of proposed solutions, as well as evaluation of other students' proposed solutions. Groups were intentionally assembled to include "experts" from three or four disciplines.

This assignment forced science students to operationalize their identity as science experts within a cross-disciplinary group to address an ill-defined problem. It also brought home to students the complexity of real world problems, which need contributions from multiple disciplines for successful resolution.

Sunday, 21 July 2013

3:15 PM

**Lessons from
“The Lesson of Grace in Teaching”**

Francis Su

Recently, I received a national teaching award at an academic conference, and in my acceptance speech to hundreds of my professional peers, I chose to speak about grace. In particular, I explained how giving and receiving grace can challenge the academic notion that you are defined by your accomplishments, and I showed how grace has shaped my teaching.

I will share excerpts of this speech, as well as reactions to my speech, which subsequently went viral online and has been shared nearly five thousand times on Facebook.

Sunday, 21 July 2013

3:45 PM

**Faith Integration in the Context of
an Undergraduate Cadaver Lab**

Kathleen Tallman

Responding to a cadaver experience might be challenging for anyone in American culture in which there is significant distance from death and the dying process. For undergraduates, the process can be even more emotionally challenging. This can result in emotional trauma for students or inappropriate blogging on social networking sites. Not only are these issues related to experience of the students, but also to the privacy and confidentiality of the cadaver.

At Azusa Pacific University, the human anatomy course addresses these issues through faith integration assignments. In the first assignment, students read three news clips about students in cadaver or clinical settings who had posted inappropriate blogs on the internet. Each situation ended in a court case in which the academic institution took action against the student internet posts. In the assignment, students are posed with questions related to the ethics of privacy and confidentiality from a faith perspective of care for one’s neighbor.

The second assignment uses the cardinal virtues of courage, prudence, temperance, and justice viewed through a lens of faith, to guide spiritual formation and character

development in responding to ethical situations.

The final assignment requires students to use the cardinal virtues to analyze the proper use of cadavers, this time in the context of the public display of cadavers.

Student feedback included an increased awareness of virtue in everyday life and the use of virtue to make ethical decisions. Students also gained an ability to view cadavers with an eye of compassion for suffering with a knowledge of technical structures.

Sunday, 21 July 2013

4:15 PM

**Catalyzing Compatibility of
Evolution and Christian Faith**

David Vosburg

Many Christians feel that their faith is in conflict with the findings of modern science, particularly evolution. Their pastors and campus ministers either perpetuate the message of conflict between faith and evolution or feel ill-equipped to tackle such an intimidating and controversial topic. Such strategies of blind opposition or avoidance endanger the integrity of the Christian faith, hinder effective witness to nonbelievers, and discourage talented Christian students from pursuing careers in science.

This session will offer several ideas and resources that have been tested on a secular campus and at the presenter’s church to promote healthy dialogue on evolution and Christian faith.

Additional suggestions from those in attendance will also be solicited.

Monday, 22 July 2013

10:30 AM

**The Flip (Blended) Classroom for
Science and Religion:
Some Preliminary Observations**

Denis Lamoureux

With the advent of computer technologies, a variety of new pedagogical strategies have arisen. During the 2012–2013 academic year, I used a Flip Classroom format two times for my introductory science and religion course at the University of Alberta. Student evaluations for both classes were the highest in the 56 times I have delivered the course over 16 years.

The GPA of both classes were nearly one grade higher (0.3 on 4.0) than the live regular lecture format.

The Flip Classroom involves students listening to audio-lectures and following class notes and handouts prior to the class. Once a week we convene for a 3-minute quiz to demonstrate that the students have examined the materials for that class. I then offer a 20-minute summary of the most important points followed by a 20-minute class discussion (10 minutes in small groups; 10 minutes with the entire class). I have noted a remarkable increase in the quality of class discussions. The remaining 35 minutes of the allotted class period is used for free dialogue, and between a third to a half of the class remains (it is often a time to share personal stories).

My next phase of using the Flip Class will be to offer it at different universities and colleges with an onsite teaching assistant and my visiting the class via Skype four to five times during the term.

The class audio-slides, notes, handouts, quizzes, and exams can be found at: www.ualberta.ca/~dlamoure/350homepage.html.

Monday, 22 July 2013

11:00 AM

**Examining Hoosier Legislators’
Continuing Attempts to Legislate
Teaching Religion in Science Class
with Four Lenses:
Science, Religion, Law, and Truth**

John Staver

Last year, I discussed an attempt in the Indiana General Assembly to legislate teaching creation science in Indiana public schools. My purpose this year is to update and discuss Hoosier legislators’ continuing attempts to legislate such teaching.

The 2012 Indiana General Assembly’s consideration of teaching creation science in school science classes is history. Senate Bill 89 passed the Senate but died in the House. Throughout the fall of 2012, Senator Kruse signaled his plan to submit a new bill that would emphasize truth in education, students’ ability to question content, and teachers’ academic freedom to teach the strengths and weaknesses of science. Senator Kruse

never introduced such a bill; however, his colleague, Representative Jeff Thompson, submitted House Bill 1283 in the House of Representatives. Representative Thompson's bill matches well with Senator Kruse's abovementioned intentions. HB 1283 also fits well with a bill (HB 1140) that Rep. Thompson introduced in the House in the 2012 session. HB 1140 remained "under the radar" and, like SB 89, never received a hearing.

In addition to reviewing the status of HB 1283, I will examine its themes through four lenses: science, religion, law, and truth. Science focuses on science as a way of knowing and on the nature of scientific knowledge. Religion centers on the many expressions of Christianity and why some conflict with science and some do not. Law focuses on a brief review of federal court cases. Truth emphasizes the differences and similarities of the meaning of truth in science and religion.

Monday, 22 July 2013 11:30 AM

Parallel Standards for Disclosing Inventions and Disclosing the Gospel

David Saunders

Patents benefit inventors by granting inventors the right to exclude others from making and using their inventions for a limited time, the patent term. The public benefits, since patented technology becomes disclosed and can be freely used, once a patent term has expired. One reading a patent disclosure must be able to make and use the invention which has enjoyed patent protection. Patent laws thus require that an inventor fully disclose how to make and use the invention, without withholding any details. The inventor cannot insert new matter, that is, add descriptive material to fill in details, after filing for a patent.

As patent laws require inventors to fully disclose their inventions, Scripture requires that followers of Christ proclaim a full, open disclosure of the Gospel; Paul writes, "... we refuse to practice cunning or tamper with God's word, but by the open statement of the truth ..." (2 Cor. 4:2, RSV).

Christians should consider what "gospel" is disclosed by consumer-driven messages. Is one made aware of his condition as a sinner, his need of the atoning sacrifice of Christ, the cost of discipleship? Is one enabled to become a Christian? As patent laws prohibit entry of new matter, Scripture prohibits entry of new matter into the faith once and for all delivered to the saints. "If anyone is preaching to you a gospel contrary to that which you received, let him be accursed" (Gal. 1:9, RSV). Contrary gospels have new matter, such as additional writings considered superior to Scripture.

FAITH AND ETHICS IN BIOMEDICAL SCIENCE

Sunday, 21 July 2013 4:15 PM

Medical Ethics and Health Care Reform

Jay Hollman

The current US health care (HC) crisis is a festering wound that continues to negatively impact health, personal finances, and the economy. Expenditures on health care are not morally neutral. Like money spent on the housing bubble and complex derivatives, it is morally wrong to create unnatural market forces and perverse incentives. The Social Security disability system was to be a safety net; now it has become a shelter for tired workers who find employment difficult. The high bar of being totally and permanently disabled to receive any benefit has created a disability litigation industry and destroys the dignity of many middle-aged workers.

The incremental reforms (of which Obama Care is the latest) have done little to reform health care and to reduce costs. Bush's addition of a drug benefit to Medicare was not funded by new revenues. A 1997 cap on physicians' fees has never fully taken effect but has caused an explosive growth of imaging. Expanding Medicaid, requiring health care insurance and eliminating rejection of coverage for pre-existing conditions will only increase the cost of health care. Electronic medical records have failed to improve efficiency.

GENETICS, PALEOBIOLOGY, AND THE HISTORY OF LIFE

Saturday, 20 July 2013 10:30 AM

A Brief History of Slime: 550 Million Years of Mollusks

David Campbell

The phylum Mollusca includes familiar snails and clams. The total variation in form is the widest for any phylum, and the known numerical diversity is second only to arthropods. Many species have shells, producing a good fossil record. Although some extinct lineages are possible or probable mollusks, many major groups survive to the present, allowing genetic investigations to combine with the fossil record for an exceptionally good picture of their history.

Possible mollusks occur in the Precambrian; most of the classes appear by the end of the Cambrian. The fossil record documents several evolutionary transitions in the group.

Although genetic analyses of early divergences in the phylum remain challenging, the molecular data do support many within-class relationships also recognized from morphological data. In turn, the current understanding of the place of mollusks within the overall evolution of animals derives largely from molecular data, but fits in with anatomical and developmental evidence to recognize the Lophotrochozoa within the protostome bilaterians.

Saturday, 20 July 2013 11:00 AM

Models of Evolving Interlocking Complexity in Biology and Economics

Loren Haarsma

Mechanical devices such as clocks display interlocking complexity – remove one part and the whole thing might stop functioning. Clocks must be assembled "by hand." But God's creation includes some systems in which interlocking complexity can self-organize and evolve.

I will present two computer models we have developed to study this. In the first, inspired by biological evolution, artificial organisms called *Pykaryotes*

have genomes which direct them to gather chemicals from their environment, move, and build “proteins” and protein complexes from gathered chemicals. Under some conditions but not others, through mutation and natural selection, they evolve increasingly larger protein complexes, showing interlocking interdependence.

In the second model, inspired by the modern industrial economy, computer agents gather resources from their environment to meet their needs and wants, specialize, trade with each other, and combine resources to make tools and higher order devices. The economy as a whole evolves interlocking complexity. The system results in agents who are motivated only by maximizing personal gain, in the short term, to become both wealthier and more interdependent with each other in the long term.

In my experience, reflecting on the evolution of interdependence—in the natural world, in human society, and in artificial models such as these which humans create—can help us better appreciate some of God’s attributes revealed in scripture and in creation.

Saturday, 20 July 2013 11:30 AM

Metaphoric Lexical-Semantic Capacity in the Erection of a Cognitive Platform for Humanity during the Paleolithic

Ralph Stearley

Classical Christian theologians have devoted thoughtful discussion to the significant role for metaphor in our knowledge of God. Indeed, it can be argued that human beings require the use of metaphor, analogy, and even anthropomorphic language to talk to one another about God. Critics of religion, such as Daniel Dennett, seem to think that metaphor and anthropomorphic language betray a fundamental flaw with religion.

However, since the 1970s, linguists and cognitive scientists have demonstrated metaphoric thought to be promiscuously utilized in all sorts of reasoning. The neurological bases for lexical storage and retrieval and for semanticity naturally endow humans with a propensity for metaphoric thought. Can we detect evidence in

the paleoanthropological record for metaphoric capability, which might undergird God-talk?

Artifact evidences include many of those items often cited as potential “shamanistic” symbolizations, such as therianthrope carvings or cave paintings. I propose here that these images are best regarded as demonstrating metaphoric capacity; their higher-order symbolizations are debatable.

Anatomical evidences include the expanded parietal/temporal regions of the skull in *H. heidelbergensis* and possibly *H. ergaster*. These expanded regions indicate investment in brain tissue which in humans today provides important association areas for lexical and semantic capacity. It may well be that antique hominids of 400,000 years prior to today were capable of utilizing metaphoric language to talk about God or gods.

Sunday, 21 July 2013 3:15 PM

The Fossil Record and the Cambrian “Explosion”: An Update

Keith Miller

The Cambrian “explosion” has been the focus of extensive scientific study, discussion, and debate for decades. It has also received considerable attention by evolution critics as posing challenges to evolution.

In the last number of years, fossil discoveries from around the world, and particularly in China, have enabled the reconstruction of many of the deep branches within the invertebrate animal tree of life. Fossils representing “sister groups” and “stem groups” for living phyla have been recognized within the latest Precambrian and earliest Cambrian. Important transitional steps between living phyla and their common ancestors are preserved. These include the rise of mollusks from their common ancestor with the annelids, the evolution of arthropods from lobopods, the likely evolution of brachiopods from tommotids, and the rise of chordates and echinoderms from early deuterostomes.

The animals of the Cambrian did not appear in all their modern complexity out of a void, but rather they provide pointers to their common ancestry.

Despite the claims of evolution skeptics, the fossil record provides multiple examples of organisms displaying transitional anatomies. The anatomical characters that define the body plans of the major living animal phyla, can be seen to have been acquired piecemeal during the early evolution of the metazoa. The divisions between phyla break down as we move closer to their times of origin from common ancestors. With continued new discoveries, the evolutionary record of living phyla is becoming ever better resolved.

Sunday, 21 July 2013 3:45 PM

Updated Notes on Genetic Prehistory

David Wilcox

“There can be no conflict between the teachings of the Scriptures and the *facts* of science ...” C. Hodge.

To understand God’s complete truth, we must take seriously the physical data. Genetic data is exploding. Increasingly powerful techniques are uncovering genomic secrets. Unique human functional sequences are pointing to unique human biological qualities. Accumulating nonfunctional sequences are tracing ancient human prehistory. This survey of emerging genetic information is intended as a preliminary for theological discussion.

I find the following issues most interesting:

- What are the *functional* genetic differences between chimps and humans?
- Closer to home, there are significant functional differences and shared similarities between our genome and the excellent genome sequences of two archaic “human” species—Neanderthals and Denisovans.
- Mitochondrial Eve and Y-chromosome Adam have been located more accurately in space and time. They did not know each other.
- Humanity was split north / south 100,000 years ago. Unity began with population movements across and out of Africa around 60,000 years ago. These emigrating folk made intimate contact with archaic populations in the Middle East and Southern Asia leaving all non-Africans with archaic genetic

sequences, notably in the HLA immune loci.

- This HLA antigen series is particularly interesting. It contains too much diversity to have been derived from just two individuals.

If theological truths depend on specific events, such data is important. If our historical traditions are contradicted by data (not just theory), our shaping principles need evaluation. As honest scientists and theologians, we must reconsider our assumptions.

PHYSICAL SCIENCES: RECENT ADVANCES AND IMPLICATIONS

Saturday, 20 July 2013 3:00 PM

The Challenge of the 4th Dimension in Modern Physics and Biblical Orthodoxy
Matthew Huddleston

I examine various perspectives on the fundamental nature of time from a biblical standpoint and describe certain key elements that fit well within Christian orthodoxy. I argue particularly that a tenseless B-theory approach must be discarded since it leads to a dualistic view of reality, as well as to a deistic Creator who is removed and disengaged from creation.

I then highlight how these conclusions contrast with a traditional block view of time as commonly presented in general relativity. The case for tenseless time as derived from the principles of relativity is then reexamined, and examples of time asymmetry in quantum mechanics and thermodynamics are given.

Finally, I present alternative approaches to time in developing models of quantum gravity that give a new perspective on relativity and allow true presentism back into nature.

Saturday, 20 July 2013 3:30 PM

Inventiveness in Portraying God's Handiwork
Clarence Menninga

On display at Calvin College is an antique miniature planetarium, construction completed in 1868.

The planetarium was designed and built by Wildrik Botjes in Appingedam, The Netherlands. The instrument was presented to Calvin College by descendants of the builder, and it has been restored to operating condition and is kept running.

The entire mechanism is driven and regulated by a Chauncey Jerome chronometer, made in about 1850 in New Haven, Connecticut. Chauncey Jerome was the world's premier clockmaker in the mid-1800s, reaching production of 150,000 clocks per year, and exporting his products to Britain and Europe. This instrument is one of several mechanical miniature planetaria that were built during that period in response to a fascination with the idea that the motions of objects in the solar system could be represented by a mechanical device.

Many details of the motions of Earth, moon, and planets are incorporated into this instrument by clever devices, including many motions not obvious to the casual observer. This presentation will include numerous photographs.

Saturday, 20 July 2013 4:00 PM

Emergence in Physics: Signposts of Creativity
Arnold Sikkema

The biological world is dependent upon the physical world. This reality, in both historical and present senses, demonstrates the original and ongoing creativity of the Creator. Theories of this "emergence" tax the creativity of scientists and philosophers, amidst the persistent optimistic claims that all of nature is reducible to physics.

A careful analysis of the nature of predictability, however, demonstrates that the ubiquity of emergence entirely *within* physics renders physics incapable of bearing this grand foundational responsibility. Examples of emergence in various subfields of physics – atmospheric science, condensed matter physics, quantum field theory, nuclear physics, biophysics – exhibit common themes and principles.

Such collective physical phenomena are generally characterized by robustness of the ordered macroscopic whole relative to variations in microscopic

parts, universality near phase transitions, and symmetry breaking. Their inescapable novelty, surprise, and incalculability, though, demand imagination and ingenuity from theoretical physicists, including what has been called by Nobel laureate P. W. Anderson "art keyed to experiment."

I will outline suggestions that reformational philosophical concepts, such as idionomy, enkapsis, and anticipation, can help nuance the claims of emergentism, whether within or beyond the discipline of physics.

POSTER SESSION

Sunday, 21 July 2013 10:30 AM

Creative Light in Introductory Physics
Scott Bonham

Creativity infuses the scientific enterprise and applications, though that is often not well communicated in the science classroom. In my introductory university course, *Light, Color and Vision*, I seek to engage nonscience students with creativity and science at multiple levels.

First, students are regularly asked to create drawings/diagrams to explain phenomena they have been exploring through hands-on activities, e.g., the formation of images by a pinhole camera.

Second, students have opportunities to be creative in homework assignments for which they photograph a real-life example of a particular phenomenon (e.g., reflections in a mirror) and explain the physics through drawings and words.

Third, connections between science and art are explored, such as the impact of the Arab scientist Ibn al-Haytham on Renaissance painting, whether Jan van Eyck utilized optical aids, and George Seurat's knowledge of emerging theories of perception.

Finally, students study the historical development – or creation – of scientific understanding of the nature of light and color, and science itself, through reading about different important contributors, from Aristotle to

POSTER SESSION

Einstein, including reading selected writings from Aristotle, Isaac Newton, and James Clark Maxwell. The hands-on and historical components also serve to help students better understand the nature of science: the roles and relationship of evidence and theory, the human and creative element, and the strengths and limits.

This course is particularly attractive to visually oriented, creative students. Over the last two years, over half of the students have come from art, photo-journalism, film, broadcasting, theater, interior design, and similar areas.

Sunday, 21 July 2013 **10:30 AM**

Creation in God's Image: Implications for Science and Faith

Alan Dickin

In seeking common ground between biblical and scientific accounts of origins, it is critical to understand the historical context of the biblical account. Vital evidence comes from the text of Gen. 1:26, "Come, let us make man in our image."

The church fathers and the reformers, including Athanasius, Augustine, Luther, and Calvin, all understood the plural here as referring to the three persons of the Trinity. However, this is hard to reconcile with a narrative source postdating the Mosaic law, which emphasized the singularity of God. For example, if Genesis is believed to be a Late Bronze Age polemic against polytheistic Middle Eastern religions, it is inconceivable that references to a plurality of gods should have a central place in the creation story. Perhaps this is why most modern theologians have turned their backs on the Trinitarian interpretation held through most of church history.

However, this rejection of the traditional interpretation of Gen. 1:26 has profound implications for how we understand the origins of the cosmos, and may be partly responsible for the polarization of views between creationists and theological liberals. On the other hand, a Trinitarian interpretation of Gen. 1:26 would imply that the stories of early Genesis were traditions handed down by a faith community within the context of

Mesopotamian civilization since the time of God's first revelations to humankind.

Sunday, 21 July 2013 **10:30 AM**

Dueling Scientists and Dueling Historians: Controversy over the External History of Germ Theory

Glenn Jones

Louis Pasteur and Félix Pouchet, two scientists studying the fermentation of organic media, engaged in debate concerning spontaneous generation before the French *Académie des sciences* in 1864. This instance of clashing paradigms is thought to be one of the most important moments in the historical development and establishment of the germ theory of disease. But was this confrontation an example of truth prevailing through purely scientific discourse, or were other external factors at play in determining the course of the debate?

A review of the literature reveals a controversy about this controversy, where historians of science disagree concerning the extent to which external factors affected Pasteur's success. Studying this scientific debate and the historiographical "meta-controversy" surrounding current scholarship informs an understanding of historical conflicts in science, their termination, and the overall process of acquiring scientific knowledge.

Sunday, 21 July 2013 **10:30 AM**

Promoting Scientific Literacy in Pastors

Craig Story and Justin Topp

We propose to build an international network of pastors committed to increasing their scientific literacy. Pastors, as with the general population, often do not have a solid understanding of modern science, either of its methods or its achievements. Together with antireligious proclamations coming from some in the scientific community, this lack of understanding of science leads to suspicion and rejection of science. Because pastors are authority figures in their communities, antiscience leanings are easily (and even subconsciously) transmitted to congregants, which can, in turn, hinder the gospel. For example, growing up

in a church that rejects evolution can have a profound effect on students when they begin to study and grasp the scientific evidence for evolution in college.

Our overarching goal is to provide pastors with tools to approach issues of science and faith with greater confidence. We aim to provide a safe forum for discussion and dialogue between pastors and working scientists who are also believers, where we will critically examine both the science and the various ways scriptural truth can be ascertained.

A one-week retreat at Gordon College, taught cooperatively with science and seminary faculty, will be offered to a cohort of pastors from the US and Korea each summer, starting in 2014. We hope this program will gain a reputation for quality and excellence and be an ongoing resource for pastors to improve their understanding and appreciation of science as a way of learning about God's world.

Funded by a grant from The BioLogos Foundation.

Sunday, 21 July 2013 **10:30 AM**

Faith and Non-Zero-Sum Game Theory

Michael Tope

This research explores whether game theory can sharpen the definition of faith, trust, and/or belief via a jointly game theoretic and information theoretic framework. Recent Evolutionary Game Theoretic (EGT) results have shown how direct and indirect reciprocity prompts collaboration toward achieving the Pareto efficient (best) outcome over the guarded, natural, and rational, but sub-optimal, Nash equilibrium.

Trust is conjectured to be built on the evidences measurable by the acquisition of mutual information between the parties.

Faith is conjectured as the difference between (1) the amount of trust known or witnessed and (2) the amount of trust necessary for one to confidently take the inherently risky action toward the Pareto efficient results.

This simple mathematical model, which seems to capture Heb. 11:1, NIV,

"Now faith is confidence in what we hope for and assurance about what we do not see," is presented along with some examples based on Monte Carlo simulations.

**SCIENCE AND FAITH: HISTORY,
PHILOSOPHY, AND THEOLOGY**

Saturday, 20 July 2013

10:30 AM

**What Hath Stuttgart to Do with
Jerusalem? Exploring a Model of
God as Engineer**

Dominic Halsmer

What role might the field of engineering play in advancing the current dialogue in science and theology? Much of the discussion centers on the concept of design. This is the forte of the engineer. God engages in what can only be described as technological activities as he wisely creates and combines resources in various ways to accomplish his purposes in the universe, and especially among human beings. Although a complete comprehension of his ways is undoubtedly well above and beyond us, the idea that we are made in God's image allows for significant understanding, appreciation, and participation in his great genius.

Even so, the negative aspects of the human condition are puzzling. Why would God permit so much evil and suffering to pervade his creation? Beginning steps toward a theodicy based on a systems engineering mindset are presented. Recent developments in complex systems analysis, affordance-based design, and forensic reverse engineering are applied to facilitate understanding of the big picture of God in his role as Spiritual Engineer. Adversity finds its place in ultimately affording critical recognition of a vital dependency on the Creator, and an opportunity for fulfillment of purpose in an eternal love relationship.

Saturday, 20 July 2013

11:00 AM

Evolving into the Image of God

Peter Hess

This paper explores theological dimensions at the intersection of biological evolution and the Christian doctrine of the "image of God." How can we reinterpret the doctrine of the *imago Dei*

to reflect what we know from science, that humans are "stardust become conscious of itself" 13.7 billion years after the Big Bang?

The Bible does not contain a well-developed doctrine of the "image of God." However, the moral and spiritual response of humans to the Word of God is intelligible only in light of the *imago Dei*. The *imago Dei* is a foundational teaching of the Christian theology, for only if humans reflect God's image are we able to comprehend and respond to God's invitation.

This paper will argue in light of contemporary science that the primary criteria for reflecting the image of God are moral understanding, spiritual responsiveness, the capability of sustaining authentic relationships, and a sense of responsibility for God's creation. This is a theology in which God works in, with, and through creation to transmit the soul integrally through the evolution of human physical nature and its increasing neural endowment.

This theology is consistent with a Hebraic understanding of the person as a psychosomatic unity, and addresses a number of important theological problems: (1) it argues against a dualism in which all and only human souls are "saved"; (2) it dissolves the genetically unintelligible disjunction between prehuman hominids and *Homo sapiens*; (3) it renders ecological theology more coherent; and (4) it maintains the integrity of both scientific and theological perspectives on reality.

Saturday, 20 July 2013

11:30 AM

**The Real Presence of Christ
in the Real World**

George Murphy

Luther's claim that divine omnipresence is communicated to Christ's human nature in the Incarnation has seemed to some Christians to compromise the genuine humanity of Christ. How can a real human body be everywhere?

I will suggest here that the presence of the risen body of Christ should be seen as an aspect of God's new creation rather than of the original creation of the world, the present order of things.

We will reflect on the use of analogy in science and in theology, and consider the possibility that some features of quantum theory and relativity might provide analogies – not demonstrations or proofs – for something similar to Luther's Christological claim. These developments in physics may thus help us toward a better understanding of God's new creation and Christ's presence in the world today.

Saturday, 20 July 2013

3:00 PM

**Dealing with Natural Selection
in Scripture**

Steve Robinson

Interpretations of scripture often change in the light of new science; prime examples include the discoveries of our heliocentric solar system and Darwinian evolution. This talk will examine several fundamental tenets of the Christian faith, their scriptural support, and how our understanding of natural selection has affected them. Topics will include sin, altruism, and divine inspiration.

Saturday, 20 July 2013

3:30 PM

**Can We Really Know
Anything at All?**

Mark Shelhamer

The universe is incredibly complex, God's interaction with it doubly so. How, then, can we know something truly and objectively? This is at the heart of both science and religion.

Complexity is not the only problem. Sensory systems are subject to imperfections: bandwidth, dynamic range, and attentional focus limit what we sense and perceive. We are not blank slates that objectively process sensory data; we create internal models through which we interpret incoming information. Even more troubling, our reasoning processes have deficits; a stark example is Gödel's demonstration of inconsistencies in logical systems. This is not to say that everything should break down in post-modernist relativism. Quite the contrary: it is clear that we do know some things. Science – most often through mathematics – makes predictions that turn out to be remarkably accurate.

Thus, humility not futility is called for. When we don't understand time, how can we claim to speak definitively about processes that seemingly take millions of years? When we don't know what makes up the majority of the universe (dark matter), how can we say that we are on the verge of understanding everything through natural science? When our own minds and thought processes are subject to distortions, how can we say that any point of view is the final and absolute truth?

What should we make of this situation? First, science has systematic means to test biases. There should, perhaps, be a similar mechanism in religion. Second, given the limitations in both fields, process may be more important than outcome. Finally, it is likely that fundamental truths in both science and religion will forever elude our understanding.

Saturday, 20 July 2013 4:00 PM

Cameras of the Watchman: The Real Relationship between Science and Religion

Scott Symington

Imagine yourself as the night watchman of the house of the universe. You have cameras labeled history, physics, philosophy, mathematics, theology, and others, which monitor different areas of the house through the respective unique points of view.

Now and then you notice that some areas cannot be fully illuminated by a camera. Therefore, you simply turn other cameras toward the same area. Even though the cameras will view the area from different points of view, they each still view *the same thing* and *together cooperatively illuminate* difficult areas.

Science and theology are not adversaries, but different fields of study providing different fields of view. If both the science and theology cameras turn to the same aspect of the universe, or reality, they together provide a wider field of vision, and not only more knowledge, but also a very productive way to verify or to discredit the accuracy each of the points of view provide. Or maybe these two different

camera views shouldn't, or can't intersect, as claimed by Stephen J. Gould's non-overlapping magisterial (NOMA), and within current popular thought.

This talk widens the field of vision to include an understanding that opposing sides in the science and theology discussion often miss, and will disprove the NOMA view, supplanting it with SOMA: symbiotic overlapping magisteria.

The talk progresses through four distinct sections: an illustration, an explanation of the real relationship between science and theology, application of set theory applied to the issue, and a one-example knock-out shot.

Monday, 22 July 2013 10:30 AM

Awe and Wonder: A Biblical Nudge to Scientists and Engineers When Innovating

Lanny Vincent

When innovating, scientists and engineers demonstrate patterns of faith. These patterns are parallel to faith patterns embedded in biblical narratives. Scientists and engineers can be better and more resilient innovators when they use these embedded faith patterns.

Vincent offers a nonreligious slant on faith, something akin to potential energy. Based upon his recent book *Prisoners of Hope: How Engineers and Others Get Lift for Innovating* (Westbow, 2011), he posits that this kind of faith is a defining characteristic of innovators when they innovate.

This potential energy (faith) converts into at least five different patterns used by innovators, whether consciously or not. The first of these five patterns—awe and wonder—is embedded in the biblical narrative of Moses and the burning bush narrative. Vincent extracts this embedded pattern from the narrative and describes how innovating scientists and engineers use it.

The other four biblical nudges are inspiration and appreciation, forgiveness and persistence, submission and humility, and gratitude and acceptance.

Monday, 22 July 2013 11:00 AM

The "Image of God": Its Scriptural Setting

Ray Williams

A fundamental doctrine of the Christian church asserts that human beings are created in the "image of God." But unfortunately, a consensus on its precise meaning has yet to be achieved. For years, biblical scholars have studied this subject and expressed a variety of opinions; but for many believers, the true meaning of God's image remains uncertain.

The objective of most interpreters has been to identify a God-given characteristic that sets humankind apart from other creatures. Is it the soul of human beings, their moral character, superior intellect, or the ability to reason and make choices that accounts for their special relationship to creation?

To resolve these questions, I suggest that it is necessary to understand the scriptural setting in which the teaching of the "image of God" is given.

A concise summary of the Genesis 1 creation account is formulated, which includes the theological truth-claims that lead up to the specific verses of interest.

A conclusion is drawn on the meaning of God's image, the functional authority it has on the earthly existence of humans, and how this is distinct from the Christian goal of being conformed to the "image of Christ."

Monday, 22 July 2013 11:30 AM

Creativity and Transhumanism: Where Are the Limits?

David Winyard

In this century, human creativity could reach its ultimate expression in *transhumanism*: a philosophical and cultural movement based on the belief that *technological enhancement* of human life (i.e., exceeding therapeutic purposes) is both feasible and desirable.

Transhumanists anticipate a *technological convergence* (especially in biotechnology, nanotechnology, robotics, information and communications technology, and applied cognitive science) that would overcome the

inherent limitations of biological bodies and minds. In their view, these efforts would eventually produce one or more new species—*posthumans*—having altered (i.e., nonbiological)

physical and intellectual constitutions and practical immortality.

Christian perspectives on transhumanism vary. Some theologians are strongly supportive; others are strongly opposed. As the technologies

of transhumanism mature and converge, Christians must consider what is at stake, the issues that transhumanism will present, and scriptural arguments for and against transhumanism.

Christian Women in Science—Time to Make It Happen!

“If we’re going to out-innovate and out-educate the rest of the world, we’ve got to open doors for everyone. We need all hands on deck, and that means clearing hurdles for women and girls as they navigate careers in science, technology, engineering, and math (STEM).”

–First Lady Michelle Obama, September 26, 2011

“We need you and we need this generation of women to stand up and serve as role models to encourage young women to develop the critical skills needed for the competitive workforce of tomorrow.”

–Senator Kirsten Gillibrand

“It is fun when you see that light bulb go off and when you know you’ve helped someone see STEM in a different way.”

–Ellen Kullman, Chair and CEO, Dupont

- **The need is critical.** Women are still often behind in the sciences¹—and Christians in science are often misunderstood. So women of faith working in science have *two* sets of hurdles! The need may be especially acute for those working in secular universities, laboratories, or companies.
- **There is a real gap to be filled.** There is currently *no* national or international organization specifically for Christian women in science or related professions.
- **We will draw inspiration and ideas from other organizations.** There are strong organizations helping women in their professions. They have done it—we can do it.
- **Our work will benefit ASA in general.** Launching such an organization will help us accomplish goals all of ASA cares about—involving more early-career scientists, increasing ASA membership, and increasing women in ASA leadership.

We need your ideas to give birth to this new group!

Join us Saturday at 8:00 PM in the Massey Board Room.

¹“According to the NSF’s 2007 report, women earned fewer than a third of the PhDs in computer sciences; earth, atmospheric, and ocean sciences; mathematics and statistics; physical sciences; and engineering ... Many of the women who earn PhDs in science and engineering and enter the workforce leave soon after they begin academic employment. They do so because certain obstacles prevent them from remaining in the field or from reaching their full potential as professionals in academia. Some of these barriers are new, but interviews Rosser conducted with women scientists in 2004 document that issues from thirty years ago remain, appearing today in somewhat different language, behaviors, and structures ...”
S. V. Rosser and M. Z. Taylor, “Why Are We Still Worried about Women in Science?,” *Academe*, magazine for the American Association of University Professors (May–June 2009), <http://www.aaup.org/why-are-we-still-worried-about-women-science>.

Contact: **Lynn Billman**, ASA Executive Council sponsor, lynn.billman@nrel.gov

ASA Business Meeting Agenda

Sunday, 21 July 2013, 7:00 PM, Neely Dining Room

- | | |
|---|------------------------------|
| 1. Call to order and opening prayer | Keith Miller |
| 2. Introduction of staff | Randy Isaac |
| 3. Next year's meeting | Bob Geddes |
| 4. Introduction of newly elected Fellows | Randy Isaac |
| 5. Recognition of fifty years of ASA membership | Randy Isaac |
| 6. Remembrances | Randy Isaac |
| 7. Financial Report | Randy Isaac |
| 8. State of the ASA | Randy Isaac |
| 9. Offering for the ASA | Keith Miller |
| 10. President's comments | Hal Poe read by Keith Miller |
| 11. Closing prayer | Keith Miller |

FROM COSMOS TO
PSYCHE
"All things hold together in Christ"
Colossians 1:17

ASA CSCA CIS
2014
ANNUAL MEETING

July 25 ▶ 28 2014
FRIDAY MONDAY

THE AMERICAN SCIENTIFIC AFFILIATION

CSCA

CIS
CHRISTIANS
IN-SCIENCE

CONFIRMED PLENARY SPEAKERS:
Dr. Megan Best – Bioethicist
Rev. Dr. Alisdair Coles – Neuroscientist
Dr. Jeff Schloss – Senior Scholar, Biologos
Dr. Barth Netterfield – Observational Cosmologist

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Hamilton, Ontario, Canada

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