

Science as an Instrument of Worship: Can Recent Scientific Discovery Inform and Inspire Our Worship and Service?

BY JENNIFER WISEMAN

*Oh Lord My God, when I in awesome wonder,
Consider all the worlds Thy hands have made;
I see the stars, I hear the rolling thunder,
Thy power throughout the universe displayed.*

*Then sings my soul, my Savior God, to Thee;
How great Thou art, how great Thou art!*

(Carl Boberg, 1885; Trans. Stuart Hine 1949)

The words of this great hymn convey the proper overwhelming sense in which the wondrous Creation of God should transform us directly into a response of awe and praise from mind, body, and spirit. The writer *sees* and *hears* the wonders of nature with his body, *considers* with his mind what all this implies, and *responds with songs* from his soul.

But is this worshipful response happening in our Christian congregations today? I believe this kind of response to the Creation can and should happen within the hearts of God's people and wherever congregations of believers are gathered. Such power can even unify believers who differ on lesser matters as we all look up outside of ourselves at the same wonders and respond with the same praise. As an astronomer, I have felt the sense of being "blown away" by seeing images of countless distant galaxies, or even by just looking up at the array of stars overhead on a dark moonless night and sensing something of the "big-ness" of God.

There are impediments to realizing the fullness of this kind of worship experience for many Christian congregations today. I believe four of the main culprits are *ignorance*, *distraction*, *controversy*, and *uncertainty*. Let me start with the first, and clarify up front that by ignorance I am simply referring to being uninformed, rather than the sometimes more negative connotations of the word. How up-to-date is the scientific knowledge of average, educated, committed evangelical church members and pastors? Americans, both adults and schoolchildren, are not ranking favorably compared to the rest of the world's developed nations in science knowledge these days. We enjoy our technological achievements and resulting gadgets, but true comprehension of scientific principles and recent discoveries is not a strong part of our culture and national conversation these days. This is reflected directly in what kinds of things are (and are not) discussed in church. In my own generally very good church experience growing up in mainstream America, I can only remember science and nature being discussed in a general way (e.g., we should look at the beauty of flowers and mountains and animals and thank God), except



(Spiral Galaxy NGC 1309, with background galaxies. Credit: [NASA](#), [ESA](#), [The Hubble Heritage Team](#), [\(STScI/AURA\)](#) and [A. Riess \(STScI\)](#))

for once in a specific way in a children’s sermon (where we were told we should not believe we came from monkeys!). That was a while ago, but how are science issues handled today? Do pastors speak about the evidence from cosmic background light for a spectacular beginning to the universe? Are the genetic codes being mapped out for animals and humans resulting in praise for God’s amazing “blueprint”? Are the advancements in nanotechnology and biotechnology and medicine subjects for discussion of good and poor uses of technology in church? The answer to these is, of course, “no”, for the most part, yet even issues seemingly more relevant to the daily lives of parishioners are often driven by current technology and scientific advancement, and an informed congregation can better understand how to praise, pray, discern, dialogue, and serve.

Related to being uninformed is the condition of *distraction* for many evangelical Christians today. The distractions of overloaded schedules, pressured jobs, divided families, and even church environments of entertainment-based worship and activities can impede a lifetime of quiet listening, learning, and contemplation. If there is no encouragement from church leaders to learn and incorporate nature and current scientific discovery into contemplation and praise and service, then there will be no space available in the lives and activities of congregants for what should be the resulting awe and praise.

But what does it mean to be *informed* about science in today’s evangelical congregations? Too often this has implied a direct relation to *controversy*, the third reason science is not often inspiring worship these days. There are many voices trying to “inform” Christians about science, and for the average evangelical congregant, discernment about which authority figure to believe can be difficult. Many times Christians are presented with a clear and strong implication that scientific conclusions, especially on issues related to origins of the universe and of life, are part of the secular “World” camp rather than the camp of “God’s Truth”. And Christians “know” that they must be on one side or the other of this stark line of worldliness. Often in more conservative churches a teaching will come from the pulpit that goes something like this: “Scientists tell us that [...], but they cannot give a reason how [...] happened; but WE know how: God is responsible!” Therefore any serious consideration of a scientific understanding of the development of the universe and life implies that one is “compromising” the teaching of the Word of God, rather than studying the details of how God works. In Scripture, however, never is the study and experience of nature seen as somehow antithetical to knowing and following the Lord; just the opposite in fact!

This often boils down to the correct interpretation of Scripture. Through sermons, radio spots, television shows, and literature, evangelical Christians are hearing adamant messages conflating the acceptance of modern scientific discovery with worldly compromise, or else providing alternative ideas that are not entirely satisfying. From Young-Earth Creationists, they hear that a literal reading of the Biblical creation account is the only correct one, so all scientific discovery must be reinterpreted to fit a recent Creation. But this robs them of the sense of awe we glean from the magnitude of space and time revealed by astronomy, geology, and fossils. From the Intelligent Design community, they hear the message that life (and perhaps the entire universe) is too complicated to develop through natural processes alone, and therefore that God’s work requires miraculous inputs of information into the natural world. This implies that somehow natural processes must not be fully God’s processes, or that God’s work through them is somehow inadequate. They also hear the message to “teach the controversy,” so that somehow by proclaiming that there is a controversy about natural processes as an adequate explanatory tool for natural history, the controversy will in fact become real. They are then surprised to find out from either advanced scientific study or from the Theistic Evolution voices that in fact there is no great controversy in the scientific community about the basic structure and timeline of the natural history of the universe and life; that in fact there need be no theological debate about how God brought (and is

bringing) the universe and life into being, rather, the issue is whether God is in fact real and responsible for all we know and are. And yet even this unifying message can sometimes seem to gloss over the central theological issues of suffering and death and fallen-ness in Creation. So every approach to origins and evolution evokes some difficulties and challenges with which the Christian congregant must grapple.

Beyond these issues of Origins, Christians also face genuine ethical issues related to science and technology: for example, should an infertile Christian couple seek modern fertility treatments that result in unused embryos? Some issues involving science and technology become politicized as well, which can be extremely polarizing. So with differences of opinion and different voices about science all appealing from both within and without an evangelical congregation, pastors and teachers will often either avoid serious scientific discussion (who wants unnecessary, divisive controversy?), or else will choose one particular viewpoint and preach it (thereby alienating anybody in the congregation who would like to consider other views).

Perhaps less divisive than controversy is the general concept of *uncertainty*, which makes church leaders timid about venturing into discussions of science. There is simply no easy theological answer for why genetic codes get fouled up, why the plate tectonics that continually shape our continents also drive earthquakes and destruction, which technologies are ethical, and whether God may sustain and redeem life in other star systems. The fact that the “natural processes” that God has created can sometimes enable and sometimes destroy life is difficult to explain when you are facing someone suffering directly from disease or natural disaster. The idea that human life has only been around for a small fraction of the history of life on earth or an even tinier fraction of the history of the universe is hard to address, given that our Scriptures focus on God’s relationship to humans. How or why should a pastor or church leader even bring up such difficult topics, when there is no clear way to bring closure to the discussion, and when it is easier to simply ask a congregation to Praise the Lord for the beautiful day?

And yet I believe it is important to rejuvenate our congregations with a sense of joy and unity in contemplating the magnificence of Creation, with forefront scientific knowledge. Since God is responsible for all nature, there is nothing to fear in studying the details; in fact God calls us to study his handiwork as a means to learning of God’s character and glory. The time has come to raise up Praise, based on knowledge and wonder, as a primary response of our congregations to scientific discovery. There is much to be gained by instilling a positive view toward science in the Church:

I. Studying the Creation can show us the nature of God.

The Psalmist writes, “The heavens declare the glory of God, and the skies proclaim his handiwork” (Psalm 19). And Paul says that people are “without excuse,” because the nature of God – his “eternal power and divine nature” – is clearly revealed through what has been made (Romans 1). Therefore contemplating God’s handiwork in Creation is not an expendable “extra” but is of critical spiritual importance for all people. So what is it that we can learn about God’s character through studying the natural world? We need to be very careful here; misunderstanding about the interface between scientific knowledge and God’s activity has caused immeasurable confusion and division. The limits of science should be clear, but often are not discussed that way. Science addresses the processes, content (matter and energy), and forces of the physical world. It is an invention for the systematic study of nature, and is not designed to address anything outside of the physical world (e.g., a spiritual realm). To point out natural processes that science cannot yet

explain should be an invitation for more scientific study with the aim of getting to a scientific explanation (thus avoiding the faulty path of seeing God only where science is – usually temporarily – not giving complete explanations). But science addresses only the “what,” “when,” “where,” and “how” questions, in a cause-and-effect sense; it cannot address the “who” and “why” questions of divine intent. The very existence of a magnificent and ordered Cosmos that we can study and comprehend can imply, for many, the existence of a divine creator, and for Christians the coming of Christ makes that creator a very personal Being. While science itself cannot address or prove the existence or non-existence of God, there are other compelling reasons, looking at nature and experience as a whole, for many people to believe in God. And from that perspective of faith, the Creation itself will reflect the nature of God. So what could we learn about the character of the Creator God by what we have discovered in the universe? This is subjective, but I believe there are several characteristics of the Creator that one could glean (not scientifically) by considering the universe in which we live:

- **Powerful**
- **Creative**
- **Creates and Loves Beauty**
- **Patient**
- **Faithful**
- **Desires Freedom**
- **Enables Life**
- **Loves**

Let me elaborate on these points.

Power is hard to describe, but when we consider that there are over 100 billion galaxies in the universe, most with hundreds of billions of stars, all the eventual result of an enormously energetic initial flash of energy over 13 billion years ago, great power is evident.

Creativity is seen in the very processes themselves. Stars, for example, are not only shining balls of gas; they are also factories where heavier elements that we rely on for life are produced. What a brilliant mechanism!

Beauty can be seen in everything from spiral galaxies to snail shells to mathematical equations of motion. The fact that beauty exists and that we are able to recognize and appreciate it has interesting implications for the purposes of Creation.

Patience is implied as we now can see, through careful astronomical study, the slow (to us) formation and maturation of galaxies and stars over billions of years, leading to our life-bearing planet, where fossils and formations tell a tale of a slowly changing Earth. Yet faith reminds us that God has been in charge this whole unimaginable time, knowing that each of us, and our Savior, would eventually appear.

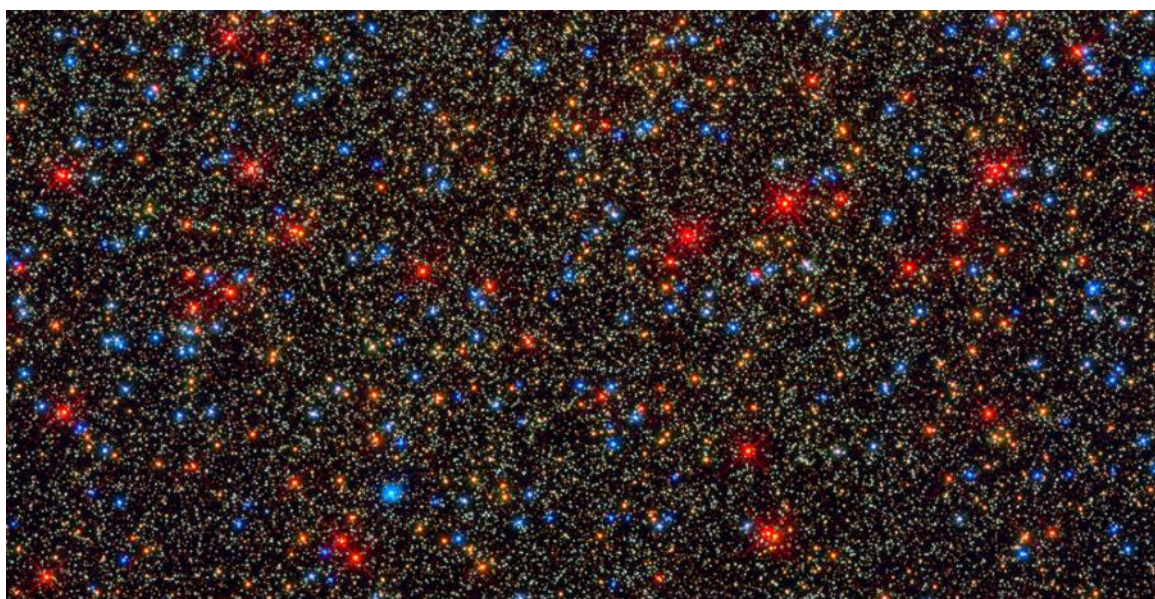
Faithfulness is implied by the very stability of the universe, and the fact that we can study it knowing that fundamental forces and principles like cause and effect are stable and reliable, making our lives

possible and meaningful. In fact we live in what appears to be a very finely tuned universe. The physical constants that describe how the forces of nature work with high quantitative accuracy are exactly right to allow life to exist and evolve and thrive for a meaningful length of time. Even tiny deviations from their measured values would have precluded life. One could try to explain this away by imagining that there could be a very large number of other universes, each with different fundamental constants and forces, so that this one that enables life as we know it is a statistical accident. If that were true, it would still be incredible that this “multi-verse” would be of such special character that even one universe within it would be a birthplace for life.

Within that framework of faithfulness, however, we see basic principles *allowing freedom* and resulting good and bad consequences; quantum mechanics and chaos theory have revealed a world of uncertain or unpredictable outcomes at fundamental levels of the physical world.

And then there is the existence of *Life*. However one believes life came about, it is undeniable that at least one planet (and maybe many others) harbors flourishing life. It appears that the universe was infused with that potential from the very beginning, and the last 13.7 billion years has seen the playing out of this resulting drama, as galaxies, stars, and planets formed, and as life appeared and diversified on the scene on at least one planet.

This all points to a God who *loves*, who desires living beings to exist, to recognize beauty and wonder in the universe, and to eventually respond in personal relationship to their Creator.



(The Omega Centauri star cluster. Credit: NASA, ESA, and the Hubble SM4 ERO team.)

II. Science can inform us of what we need to do, as stewards of God's Creation.

Humanity faces tremendous moral dilemmas today, most of which have a scientific relevance. As followers of Christ, we understand that our lives are entrusted to us for a short time, and that we will give an

account for the things we do. So as stewards of our lives, and as disciples entrusted to build God’s Kingdom on Earth, it is essential to have knowledge and wisdom to shape the impact of our lives. Are we polluting the environment by our lifestyles? Clear studies of the relationship of how we live and the environmental impact on others are vital for God’s people. What about service? A well-intended project to provide irrigation or livestock for one needy people group may well end up polluting and destroying an ecosystem downstream. Scientific understanding can foster wisdom for the best choices of lifestyles and service. And informed Christians can lead the pack in helping “science to inform science” when it comes to difficult ethical dilemmas. For example, farming systems that intensively confine animals may offer a promise from agricultural science of more food production to feed more people. But informed Christians can rightly cry foul, because the sciences of animal behavior and medicine clearly show that such confinement is inhumane and thwarts even minimal natural social and physical needs of animals, and environmental science shows that pollutants from such “factory farms” are devastating. The Biblical mandate for compassion for both people and animals is violated. Thus by combining compassion and prayer with broad scientific understanding, wisdom and clearer discernment will equip the Church for effective discipleship and social leadership.



(Earthrise: our beautiful, fragile planet, as seen from lunar orbit. Credit: NASA/Johnson Space Center)

There may be strong differences of opinion, between equally committed believers, as to the right use of science and technology. Should we genetically modify plants and animals, to provide a more abundant food supply? Should we design sophisticated weapons that can unintentionally destroy innocent lives? Should we use medical technology to prolong life at all costs? Such challenging issues can be an exercise in teaching God’s people how to be informed, how to articulate a viewpoint, and how to weigh respectfully the opinions and concerns of others, without necessarily condemning alternative points of view. In this way the Church can also set an example to the nation and the world of how healthy, respectful dialogue can foster productive progress in addressing difficult public issues.

But how important are these issues, if the return of Christ is eminent? This is a realm of theological understanding that can affect whether some churches consider stewardship of technology and environmental protection as an important mandate of God, or even relevant to the future, if in fact there may be no long-term future of the present Earth. This requires careful teaching on the balance between embracing Godly stewardship principles with the intent to bless the world now and for many, many generations to come, while at the same time becoming spiritually ready to join the Lord however soon that may take place.

There is yet another realm of Christian discipleship in science, and that is simply the joy of exploration for its own sake, or rather, as a means of discovering and sharing what God has done. Sharing the wonders of Creation, as scientific discovery reveals them, is a great service to others. Since I am an astronomer studying distant star-forming regions, and I work for our nation’s space exploration agency, I am sometimes

asked by citizens of the public why we should spend any time or money on studies of outer space while there is so much human suffering on Earth: shouldn't we solve the world's problems first, before we spend money and effort exploring the oceans or the forests or distant galaxies? I have seen good people get very angry over what can appear to be completely unethical priorities; for instance should we send a probe to study Saturn when we could instead feed hungry children here on Earth? These dilemmas will always be present, and they are not simple. But I believe that God has called us to do BOTH: that is, to serve the poor and the suffering, AND to explore and study his Cosmos. In fact, it is those moments of great discovery and exploration, such as the first moon landing, or the Voyager images of Jupiter's moons, or the historic first images from the Arctic explorers, that lift the human spirit and give us pause to contemplate the larger context and meaning of our lives. I have found kindred spirits, excited to learn about space, in both the western academic world and amongst the youngsters in impoverished, developing nations. Curiosity and wonder bring us together. We get a Biblical glimpse of this in Genesis, when God asks Adam to name all the animals. The text gives the sense of God's pleasure as Adam sees the wondrous variety of creatures, and descriptively names each one.

And how should Christians view science and scientists? Since science is a systematic search for truth, and Christians believe that all truth is God's truth, then there should be true appreciation for these "messengers" who devote their lives to understanding the details of God's creation and who share their discoveries of scientific truth. Of course as human beings, scientists are sinful and fallible like everyone else. But the portrayal of science and scientists in the church should be a positive one. In fact, historically a great many leading scientists have done their work as explicit service to God (e.g., Blaise Pascal and Johannes Kepler). It should be no different today. Our congregations should encourage young people to go into science, and to see this (and all noble careers) as service to God. And imagine the difference it could make to the whole world if Christians would lead the use of science in a path compelled by love, compassion, and service!

III. Understanding the natural world gives us a deeper knowledge of Jesus Christ.

This third and most profound reason to infuse our worship with the study of nature is also the most enigmatic. For most Christians, contemplating the majesty of creation – the mountains and glaciers and planets and galaxies – and the God responsible for it all, is quite different from communing with our Savior who healed the sick and died on a cross. In fact these can seem to bear no relationship to each other at all, other than that Jesus is the beloved Son of God the Creator. But I have discovered a profound truth that bears emphasis in teaching our congregations. Jesus, the Christ ("Messiah", or "Chosen One") was not only the Redeemer, becoming incarnate as a man as divine remedy for the sins of humanity. He is also profoundly described as the Living Word through whom the universe was created and is upheld:

"In the beginning the Word already existed. He was with God, and he was God. He was in the beginning with God. He created everything there is. Nothing exists that he didn't make. Life itself was in him, and this life gives light to everyone. The light shines through the darkness, and the darkness can never extinguish it." (John 1, New Living Translation)

And from Hebrews:

"In the past God spoke to our ancestors through the prophets at many times and in various ways, but in

these last days he has spoken to us by his Son, whom he appointed heir of all things, and through whom he made the universe. The Son is the radiance of God's glory and the exact representation of his being, sustaining all things by his powerful word."

(Hebrews 1, Today's New International Version)

Our worship should embrace the revelation that the Universe we explore was conceived and is continually upheld by our Savior. That the Christ who lived among us for 33 years on earth as Jesus is also responsible for galaxies, black holes, planets, oceans, and porcupines. To focus more closely: when we say, "Jesus is Lord," we must mean that "Jesus is Lord of all time and space." Who was Lord at the Big Bang when Time began? Jesus. Who was Lord when the first galaxies coalesced and the first stars turned on? Jesus. Who was Lord as galaxies evolved and our own solar system came into being? Jesus. Who was Lord during all the epochs of life on Earth – the Cambrian, the Pleistocene, the era of early hominids? Jesus. And who will be Lord as long as time exists, and forever outside of time as well? Jesus.

No, this is not easy to contemplate and understand. There are troublesome questions here. We could ask, for instance, what was the Lord doing when thousands of species went extinct during the ice ages? Or what about Jesus on Earth: did Jesus *know* all about the universe during his 33 years of human life? If He was responsible for all space and time, then why didn't He ever talk about the vastness of the universe, or even other continents unknown to his peers? Or more pointedly, did He already know how, for example, to prevent polio? Why didn't He tell people then, if He was good? If He didn't know these things, and yet all things were created through Him, how do we understand and accept that? I don't know the answers, except that the Scriptures say that the human nature of Jesus had to learn through study and obedience, and I take on faith that He knew and said just what was needed to reveal during that period, nothing less and nothing more. There is a deep sense that Jesus provided (and still provides) a new transformed mind and life, aligned with God's will. Science can then be a vessel for serving God and the world by unlocking the mysteries of nature through dedicated investigation.

Our worship of the Risen Christ should therefore acknowledge not only His victory over sin and death but also His Lordship over all time and space. In this way, scientific discovery can lift the minds and hearts of believers to a deeper level of awe and reverence for the King of Kings and Lord of Lords Who is also Lord of all Creation.

There is another verse to the hymn of praise for Creation that opened this essay:

*And when I think that God, his Son not sparing,
Sent Him to die, I scarce can take it in;
That on that Cross, my burden gladly bearing,
He bled and died to take away my sin*

*Then sings my soul, my Savior God, to Thee;
How great Thou art, how great Thou art!*

IV. Science can give us a better understanding of ourselves.

The scriptures teach that humans are made in the image of God. The very Spirit of God can dwell within us! That means a true uniqueness: we can contemplate the meaning of our own lives, discern good and evil, and even pray to the Lord our Maker, expecting a response. It is undeniable that we have Dominion over all other living things on Earth, for better or for worse. So how can we benefit from scientific understanding?

Science can clear up what is, and what is not, unique and significant about humans. This is not always comfortable knowledge. For example, research is showing profound similarity between humans and other mammals, in terms of genetic makeup. Studies of animal brains and behavior are showing emotions and social structures that are familiar to us. Elephants grieve for years when a family member dies. Several mammalian species are now known to develop tools and teach their young how to use them. Some primate families are known both for profound family loyalty and also for occasional violent murderous raids on other clans. What do we make of this? Our increasing appreciation for the animal world should inspire better treatment of our non-human neighbors, based on compassion and knowledge of their needs. But it need not make us feel threatened in value; rather than pulling humans “down,” greater appreciation of the animal world can give us more of a sense of unity with the rest of Creation, and an appreciation for how they, too, are loved by God. This is especially true if humans have a special relationship with God, as being made in God’s image. The “dominion” God has given us becomes a solemn sense of the need and call for great care for our fellow creatures, whether they live in forests or farms or laboratories.

What about life elsewhere? We are on the threshold of a very unique time in all the history of our astronomical discovery. For the first time in human history, we are now actually detecting planets orbiting other stars. It is no longer a mystery as to whether other solar systems exist. Now the rapid quest amongst astronomers is to advance our technology so that we can find planets like Earth, if they exist, around other stars, rather than just the large Jupiter-like gas giant planets currently detected. Given the rapid pace of finding these “extra-solar” planets, it will probably be just 10-20 years until we find a terrestrial planet like Earth with an atmosphere. Will we find signs of life? Finding even bacteria or fungus would be an amazing discovery. It would show us that God has many living worlds under His watchful care. But what would this mean for human significance? What would it mean if there were actually intelligent civilizations out there? We’ve all watched enough science fiction to imagine what that could mean. The Bible is silent on the possibility of life on other worlds, though it is clear that anything that exists is under God’s domain.

We don’t know yet if the universe is teeming with life. It very well could be – we find life in every odd nook and cranny of planet Earth. But in any case I believe the search is a good thing, and it does remind us that our significance before God is not due to our position in space or time, or even our uniqueness as living beings. Our lifespan is short, and as for our position in space, Galileo’s early science confirmed that our planet is not in the center of the solar system (and our Sun is not an unusual star, and it is not in the center of the Galaxy, and our Galaxy is not in the center of the Universe, and there may be other universes... you get the picture). And yet the magnificence of the Cosmos and the complexity of life as revealed by science show us that we are a part of something truly profound. We are reminded through Scripture that our significance before God is because of His choice to love us, to have compassion on us, to give us life:

“As a father has compassion on his children, so the Lord has compassion on those who fear him; for he knows how we are formed, he remembers that we are dust. As for man, his days are like grass...

But from everlasting to everlasting the Lord's love is with those who fear (respect) him... Praise the Lord, all his works everywhere in his dominion." (from Psalm 103)

King David came to this very conclusion, as he sang in Psalm 8:

*Oh Lord, our Sovereign, how majestic is your Name in all the earth! ...
When I consider your heavens, the work of your fingers, the moon and the stars, which you have established,
What are human beings that you are mindful of them, mortals that you care for them? [Yet] you made them a littler lower than God, and crowned them with glory and honor.*

We've now considered several reasons why it is imperative to help our evangelical congregations become better informed about science and more attuned to worshipping the God of all space and time. But can scientific discovery also inspire more *unity* in the Body of Christ? I believe so. Over the past few years I have given virtually the same presentation on the beautiful and wondrous things we are discovering in astronomy, and the relationship to faith in Christ, to Christian groups ranging from very conservative Bible study groups to audiences at large evangelical outreach events and to even more liberal Protestant congregations. I may mention the different ways Christians choose to interpret Scripture and relate it to science, but mostly I focus on the excitement of exploration, the beauty we see, and the resulting Praise to God. I get the same response from nearly everyone: joy in discovery, relief to know that it's "okay" to believe in God and accept scientific discoveries, and excitement, especially from youngsters, about joining the quest for exploration, and, from some, an expression of a deeper sense of humility and love for their Creator than they've ever known before. Don't you think this pleases the Father?

"For astronomy is not only pleasant, but also useful to be known; it cannot be denied that this art unfolds the admirable wisdom of God."

- John Calvin (1509-64), Theologian and Reformer



Jennifer J. Wiseman is an astronomer and author. She currently serves as Chief of the ExoPlanets and Stellar Astrophysics Laboratory in the astrophysics science division of NASA [Goddard Space Flight Center](http://www.nasa.gov/goddard) in Greenbelt, MD. Wiseman graduated from the Massachusetts Institute of Technology with a bachelor's degree in physics and received her doctorate in astronomy from Harvard University in 1995. She has conducted research at the National Radio Astronomy Observatory and at The Johns Hopkins University. In 1987, Wiseman co-discovered the comet 114P/Wiseman-Skiff. Wiseman was selected as the 2001–2002 Congressional Science Fellow of the American Physical Society and served on the staff of the science committee of the U.S. House of Representatives. From 2003 to 2006 she served as the program scientist for the Hubble Space Telescope at NASA headquarters in Washington, D.C.