Islam and Science

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Introduction

In an increasingly complex world, Muslims find themselves confronted with a range of thought-provoking questions from issues of ethics and identity to the challenges posed by technology and society, all of which shape how we live and think. Among them, one question stands out: How does Islam, a tradition rooted in divine revelation, relate to the rapidly evolving world of science?

This question is not just academic. The rise of movements like New Atheism has fueled doubts about how Islam and science can coexist, with some critics using science as a tool to challenge or even discredit religious beliefs. In this context, science is sometimes weaponized to claim that modern discoveries render religious teachings obsolete or incompatible with reason. As a result, for many Muslims the conversation around Islam and Science[1] is not always a quest for meaningful integration, but a battleground where the very foundations of belief are questioned and science is used to advance atheism.

1 Throughout this text, "Islam and Science" (with both words capitalised) refers to the formal academic field or disciplinary corpus concerned with the study of their interaction. In contrast, "Islam and science" (with a lowercase 's') refers more generally to the relationship or engagement between Islamic thought and the sciences, without necessarily implying a defined field of study.

Science is sometimes weaponized to claim that modern discoveries render religious teachings obsolete or incompatible with reason.

Yet despite these challenges, Islam and Science has a much deeper, richer history of engagement, one that extends far beyond debates with atheism or materialism. For centuries, Islamic thought has sought to understand the world as a reflection of divine order. Today, as new scientific discoveries push the boundaries of what we know about the universe, human life, and the natural world, Muslims are once again called upon to engage thoughtfully and meaningfully with these developments.

The attempt to make sense of the current interfaces between Islam and the modern sciences has made Islam and Science an emerging discipline in its own right, one that has captured the attention of scholars from various backgrounds, each one bringing unique perspectives and foci. Some have sought to harmonize the Qur'anic revelation with scientific inquiry, believing that faith and science can enrich one another. Others, however, have been more cautious, warning against adopting purely materialistic frameworks that could erode Islam's core spiritual and metaphysical principles. These diverse approaches have given rise to a developing field, one in which Muslim scholars, theologians, and scientists are actively engaging with how Islam and science intersect.

This essay overviews this evolving field by mapping out the key discussions, highlighting major contributors, and offering insights into how Islamic thought has historically engaged with science, as well as its interaction with modern developments. It is divided into two parts: 1) exploring the field's historical development and 2) examining its current state. Before diving into these topics, however, it is important to outline a few key considerations that will guide this exploration.

Caveats

The broader field of Science and Religion, of which Islam and Science is a part, has a longer and more established history. Beginning in the 1960s, the formal study of Science and Religion was primarily developed by Christian scholars, and much of its foundational literature reflects Christian theological concerns. In contrast, structured contributions to the field of Islam and Science began to emerge only in the 1980s. As a result, it remains a relatively young field. While significant progress has been made in recent decades, it is still defining its boundaries and developing a distinctive discourse, particularly when compared to the longer-established Christian-centric scholarship.

The pace of development in the field of Islam and Science has been relatively gradual due, in part, to the lack of dedicated institutional infrastructure focused specifically on this area of study. Historically, much of the formal infrastructure for exploring the relationship between science and religion was developed in predominantly Christian contexts, which naturally shaped the discipline's early direction. As a result, space for the systematic development of Islam and Science as a distinct field has been more limited. Additionally, the legacy of colonialism disrupted many Islamic intellectual traditions and therefore delayed a broader engagement with modern scientific challenges. In the post-colonial period, many Muslim-majority nation-states focused on economic development, political consolidation, and establishing modern education systems, often adapting Western models to meet immediate societal needs. This shift in priorities, while necessary for national rebuilding, meant that interdisciplinary engagement between Islam and science did not always receive dedicated institutional support. Although these factors have further influenced the pace of growth, recent efforts are fostering more significant dialogue and progress.

Consequently, while Christianity has benefited from the production of more than ten comprehensive textbooks on Science and Religion, no equivalent textbook on Islam and Science exists today. Existing works often relegate Islam to brief overviews or footnotes, highlighting the urgent need for more structured academic resources. That said, a growing number of scholars are now working in this space, some more directly than others, and the field is gradually expanding.

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It is important to recognize that the development of Islam and Science has varied across different areas. Some topics, like evolution and its compatibility with Islamic teachings, have been more thoroughly explored, resulting in a richer body of scholarly debate. These discussions often draw from both classical Islamic thought and contemporary scientific paradigms. However, this depth is not universal, and many other areas have yet to reach the same level of scholarly engagement.

Newer and rapidly emerging areas, such as the implications of artificial intelligence (AI), bioethics, and environmental science, are still in their infancy. For instance, while AI is revolutionizing multiple sectors, its ethical and theological implications have only recently begun to be explored in Islamic contexts. Similarly, bioethical issues like genetic modification or reproductive technologies have prompted some early Islamic legal discussions. But these remain fragmented and far from comprehensive. Despite its increasing global importance, environmental challenges like climate change are still finding their place within Islamic theological and legal frameworks.

This uneven development should not be viewed as a gap or a sign of neglect, but as a natural reflection of how the field is evolving. As the global landscape of science and technology shifts, so too does the focus of Islamic scholars and thinkers. Some areas progress more rapidly, while others take time to adapt and integrate modern scientific advancements with traditional Islamic thought. This process, though complex and sometimes slow, highlights the field's dynamic nature and potential for future growth. With that cleared, we can start by looking at the history of Islam and Science.

Part I
History

The history of Islam and Science presented here primarily focuses on the Arab world, as much of the existing scholarship has centered on this region. However, this is just one part of a much larger story. The intellectual traditions and historical experiences of other regions—including Iran, South Asia (before and after partition), Southeast Asia (e.g., Indonesia and Malaysia), Sub-Saharan Africa, and Muslim diaspora communities in the UK, USA and North America—remain underexplored. But despite often being absent or only briefly mentioned in the relevant discussions, they offer valuable insights into how different Muslim communities have engaged with scientific thought. Expanding research into these contexts is essential for developing a richer, more nuanced understanding of the field. The history that follows, therefore, should be seen as one piece of a much broader and evolving narrative, one with many gaps still waiting to be explored.

Early Years

The seeds of what we now call Islam and Science can be traced back to the intellectual efforts of key figures like Jamāl al-Dīn al-Afghānī (d.1897), Sayyid Aḥmad Khān (d.1898), Muḥammad ʿAbduh (d.1905), and Rashīd Riḍā (d.1935). These scholars were among the first to grapple with the challenges of modernity, particularly the rapid advancement of major Western powers. However, while their work laid the groundwork, Islam and Science as a distinct field of study only began taking shape in the 1980s.

The ascendance of the European colonial powers was seen as directly linked to their mastery of modern science and rational thought.

What concerned these scholars was the stark contrast between the West's technological and intellectual progress and the stagnation they perceived in the Muslim world. The ascendance of the European colonial powers was seen as directly linked to their mastery of modern science and rational thought. For these Muslim reformers, this presented both a threat and an opportunity: a threat in that it challenged Islamic societies' sovereignty and an opportunity because they believed that Islam, when properly understood, could accommodate and even encourage scientific progress. Due to space limitations, this discussion will focus primarily on ʿAbduh and Khān, as their contributions engaged most explicitly with this field's questions.

Hailing from Egypt, ʿAbduh's work provides a telling example of this effort to harmonize Islam with science. In his *Al-Islām wa-l-Naṣrāniyya maʿa al-ʿIlm wa-l-Madaniyya* (Islam and Christianity in Relation to Science and Civilization), ʿAbduh contrasts the two religions' histories, arguing that Islam has historically had a much better relationship with scientific inquiry than Christianity. His work was a

direct response to the Orientalist critique that painted Islam as a stagnant force, one incompatible with reason and science. According to ʿAbduh, while Christianity had often been at odds with science, Islam had always encouraged the pursuit of knowledge, as evidenced by the flourishing of science and philosophy during the Islamic Golden Age (8th to 13th centuries).

The intellectual contributions of Khan (d.1898), an Indian thinker and reformer, also helped set the stage for modern discussions on Islam and Science. Deeply concerned with the need for Muslims to engage with modern science and technology to revive the Muslim world, he founded the Muhammadan Anglo-Oriental College—later known as Aligarh Muslim University (founded in 1875)—which became a hub for modern scientific education in India. Like Abduh, Khan believed in the compatibility of Islam and reason and stressed that Islamic teachings were inherently rational and in harmony with science. However, he also rejected superstitions and miraculous claims that violated natural laws, interpreting them as moral lessons rather than literal events.

This early period was also shaped by the intellectual context of Orientalism, which viewed Islam and Muslims through a lens of cultural and intellectual superiority. Orientalist scholars often depicted Islam as backward and barbaric, having little to contribute to either science or philosophy. A key example of this narrative is the so-called "decline theory," which blamed al-Ghazālī for the Muslim world's intellectual collapse. According to this view, his critique of philosophers like Ibn Sīnā (Avicenna) stifled rational thought and scientific inquiry, leading thereby to the decline of Islamic civilization. This narrative was used to reinforce the idea that Islam, in contrast to Western Christianity, was inherently opposed to scientific progress.

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Afghānī, Khān, ʿAbduh, and Riḍā all sought to push back against these assumptions on the ground that Islam had historically been a driving force behind science. In their view, the problem was not Islam itself, but the social, political, and intellectual circumstances that had led to the decline of Muslim societies. By engaging with modern science and reinvigorating the Islamic tradition, they believed the Muslim world could once again thrive intellectually and scientifically.

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These four figures are often referred to as "reformers," a title that carries both positive and negative connotations, depending on who is assessing their legacy. For some, they were misguided in their efforts to reconcile Islam with modernity and overly accommodating to Western ideas at the expense of the Islamic tradition. Others see them as visionary thinkers who sought to revitalize a stagnating Muslim world by embracing the positive aspects of modern science and rationality. Somewhere in between, some argue that while their intentions were sound, they may have pursued their goals in ways that were flawed or premature.

Regardless of where one stands, however, their intellectual efforts have left a lasting impact on the Muslim world. Not only did their works open the door to a deeper engagement with science and modernity, thereby setting the stage for the later development of Islam and Science, their legacy continues to shape the conversation around how Islam can or should interact with the challenges of the modern scientific age.

Shifting Tides

As the 20th century progressed, the Muslim world underwent significant transformations, most notably with the dissolution of the Ottoman caliphate in 1924. The caliphate, long seen as the symbol of Islamic unity and authority, had for centuries provided a political and spiritual anchor for Muslims. Its dissolution by Mustafa Kemal Atatürk, who replaced it with the Turkish Republic, sent shockwaves throughout the Muslim world, not only marking the end of a centuries-old institution, but also representing the symbolic end of global Islamic political power.

This period of upheaval coincided with the rise of Western colonial powers, which had already begun to reshape the Muslim world politically, socially, and intellectually. In many regions, they marginalized Islamic institutions and traditions by imposing Western political models and educational systems. The caliphate's collapse further exacerbated these changes, leaving Muslims to grapple with the loss of a central authority that had unified them under a shared Islamic framework. The emergence of modern nation-states in the wake of colonialism redefined Muslim identity along national, rather than religious, lines.

The creation of new Muslim-majority nation-states in the Middle East, South Asia, and North Africa brought with it new challenges. These nascent states sought to modernize their economies and political systems, often adopting Western models of governance and education, which placed a growing emphasis on science and technology as essential components of national progress. For these states, the question of how to balance the demands of modernity with Islamic values became increasingly urgent.

In Egypt, for instance, figures like Tanṭāwī Jawharī (d.1940) began exploring how modern scientific discoveries could be reconciled with Islamic teachings. His *tafsīr Jawāhir al-Qurʾān* (*The Pearls of the Qurʾan*) reflected his belief that modern science was only beginning to uncover the Qurʾan's hidden scientific truths. This work was

one of the earliest attempts to integrate modern science directly into the Qurʾan's interpretation. In doing so, Jawharī was responding to both the internal needs of his society, which was grappling with rapid modernization, and the external pressures of colonialism, which had portrayed Islam as backward and incompatible with progress.

The establishment of modern universities, such as the University of Cairo (founded in 1908) and Aligarh Muslim University, was part of this effort to modernize while maintaining an Islamic identity.

This was a time of intense intellectual reflection for the Muslim world. On the one hand, scholars like Jawharī were trying to demonstrate that Islam had much to offer in the realm of scientific knowledge, thereby countering colonial narratives of Islamic inferiority. On the other hand, the new Muslim states were navigating their relationships with Western powers and adopting modern scientific and educational reforms as part of their nation-building efforts. The establishment of modern universities, such as the University of Cairo (founded in 1908) and Aligarh Muslim University, was part of this effort to modernize while maintaining an Islamic identity.

At the same time, the loss of the caliphate and the emergence of these new political realities raised difficult questions about the future of Islamic governance and law. With no central authority to guide them, Muslim intellectuals and leaders were left to determine how Islamic principles could be applied within the framework of modern nation-states. This led to varied responses: some called for the establishment of Islamic states governed by the Sharia, while others sought a more flexible approach that would allow Islam to coexist with secular laws and modern scientific advancements.

As these newly formed states began to navigate their post-colonial realities, the question of how to reconcile Islamic tradition with modern science became a central concern. While many intellectuals and political leaders embraced modern science as a means of achieving progress and asserting independence from the Western powers, there remained an ongoing debate about the place of religion in this new world order. For some, Islam and science were seen as complementary forces that together could propel the Muslim world into a new era of intellectual and technological achievement. For others, the adoption of Western scientific methods was seen as a threat to the integrity of Islamic teachings.

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This intellectual tension would continue to shape the discourse of Islam and Science in the decades that followed, as Muslim thinkers sought to strike a balance between modernization and the preservation of Islamic values.

First Generation

The 1980s marked a turning point in the discourse on Islam and Science, as two dominant approaches began to shape the field. On one side was the Islamization of Sciences movement, which viewed modern science with deep skepticism, arguing that its philosophical and

historical foundations were rooted in materialism and secularism. Advocates of this movement sought to reframe scientific knowledge within an Islamic epistemological framework that aligned with religious and spiritual principles. On the other side was the scientific miracles in the Qurʾan (*iʿjāz ʿilmī*) approach, which took a highly optimistic stance toward modern science. This perspective held that the Qurʾan had anticipated many scientific discoveries—from cosmology to embryology—centuries earlier, demonstrating the text's divine nature. Together, these two strands defined the first generation of scholars in the modern discourse. Their efforts transformed the conversation from scattered, individual inquiries into a structured and expanding academic field. This period represents the formal emergence of Islam and Science as a distinct area of study, laying the foundation for future developments.

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The Islamization of Sciences movement was championed by prominent scholars such as Ismāʿīl Rājī al-Fārūqī (d. 1986), Sayyid Muḥammad Naqīb al-Aṭṭās (b. 1931), Ziauddin Sardar (b. 1951), and Seyyed Hossein Nasr (b. 1933). While all of them agreed on the need to Islamize scientific knowledge, they differed in their approaches. Al-Fārūqī sought to establish an Islamic framework for all fields of knowledge, arguing that modern disciplines should be restructured to reflect Islamic metaphysical principles—such as *tawḥīd* (divine unity)—rather than being based on secular or materialistic foundations. Al-Aṭṭās, on the other hand, critiqued the epistemological foundations of Western science, arguing that its emphasis on empiricism and secularism had led to a loss of spiritual insight, and called for reviving an Islamic worldview that recognized divine realities as central to knowledge. While

sharing their skepticism of Western scientific frameworks, Sardar placed more emphasis on science's social and ethical implications, advocating for a reform of scientific thinking that would prioritize the needs of Muslim societies and ensure that science served ethical and communal goals. Meanwhile, Nasr offered a philosophical critique of modern science's materialism and its environmental consequences, advocating for a return to sacred science—an approach to knowledge that integrates spiritual and ethical dimensions into the study of nature.

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The concept of scientific miracles in the Qurʾan was far more optimistic about modern science. Proponents of this view, such as Maurice Bucaille, argued that the Qurʾan contained verses that accurately described modern scientific phenomena, often centuries before these discoveries were made. Bucaille's influential *The Bible, the Qurʾan and Science* compared the scriptures of Islam and Christianity, concluding that the Qurʾan was remarkably consistent with modern scientific knowledge, while the Bible was not. This view was particularly popular in the Muslim world, as it provided a way for believers to see the Qurʾan not only as a spiritual and moral guide, but also as a source of scientific wisdom.

Advocates of *iʿjāz ʿilmī* pointed to various verses as anticipating discoveries in embryology, astronomy, geology and other fields. For instance, references to the development of the human embryo were seen by some as evidence that the Qurʾan predated modern understandings of embryology. Similarly, verses describing the expansion of

the universe were interpreted as a reference to the Big Bang theory. This strand of thought was completely positive about modern science, arguing that the Qurʾan had anticipated all modern scientific discoveries, thereby affirming the text's divine origin.

The Islamization movement was critical of the philosophical underpinnings of modern science and sought to reformulate scientific knowledge within an Islamic framework.

It is interesting to note that while these two movements both sought to address the relationship between Islam and science, they did so in very different ways. The Islamization movement was critical of the philosophical underpinnings of modern science and sought to reformulate scientific knowledge within an Islamic framework. In contrast, the *iʿjāz ʿilmī* proponents embraced modern science, seeing it as a confirmation of the Qurʾan's miraculous nature and a proof of Islam's timeless truth.

Second Generation

As the field of Islam and Science progressed into the 1990s and early 2000s, a second generation of scholars, among them Mehdi Golshani, Mohammad Basil Altaie, Bruno Abd-al-Haqq Guiderdoni, and Nidhal Guessoum, began to offer critical reflections on the first generation's approaches. They brought a new perspective shaped by their backgrounds in the natural sciences, contributing both academically and through public outreach.

Critics of the 'Islamization of Sciences' movement argued that, while the movement sought to integrate Islamic principles into modern scientific discourse, it often remained too theoretical. Scholars like

Golshani pointed out that the movement lacked practical application and tended to focus more on philosophical critiques than on offering concrete solutions for incorporating Islamic values into scientific research. Some believed that the ambition to reform entire fields of knowledge was overly idealistic and did not engage sufficiently with how science operates in practice.

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On the other hand, the *iʿjāz ʿilmī* approach faced criticism for its uncritical acceptance of modern science. Guessoum, Guiderdoni, and others raised concerns that in its eagerness to demonstrate the Qurʾan's alignment with modern scientific discoveries, this approach risked misinterpreting both the scientific facts and the Qurʾan itself. They argued that retrofitting scientific discoveries into its verses often led to selective readings that could undermine the text's broader spiritual and ethical guidance. Guessoum and others also warned that this approach reinforced a positivist view of science, reducing Islam's rich metaphysical and moral framework to mere predictions of scientific phenomena.

Amid these critiques, Muzaffar Iqbal offered a distinct but related response. In his *Islam and Science*, Iqbal introduced the idea of decolonization as a way to move beyond the first generation's approaches. While part of the Islamization discourse, his work called for a more specific decolonial critique, arguing that the continued reliance on Western scientific models and methods represented a colonial legacy that Muslim societies needed to overcome. He rejected the idea that modern science, shaped by post-Enlightenment secularism, could be seamlessly integrated into an Islamic worldview. Instead, he advocated for

reclaiming an authentic Islamic scientific tradition that would not merely imitate Western frameworks but develop independently, one grounded in Qurʾanic principles.

Iqbal's work, however, has been met with its own criticisms. His vision of a decolonized science has been described as overly nostalgic and exclusionary. Critics argue that his historical reconstruction presents an idealized and distorted view of Islamic scientific history, rooted in a longing for a mythical past of religious purity. Furthermore, his critique of Western science as being inherently incompatible with Islamic values has been seen as lacking practical alternatives, leaving unresolved questions about how an Islamic science would operate within a globalized, modern context.

Ultimately, the second generation's pushback prompted a significant shift. Rather than focusing on grand narratives such as the Islamization of sciences or decolonization frameworks, and moving beyond the *iʿjāzʿilmī* discourse, these and a new third generation of scholars began to explore more localized and specific inquiries. We shall now turn to this.

Part II
The Current Map of the Field

In recent years, the field of Islam and Science has undergone significant diversification, with scholars from various disciplines contributing to a growing body of research. This section does not aim to present definitive conclusions, but rather to map out key discussions and possibilities that have emerged in contemporary debates. As the field expands, thinkers are exploring new ways in which Islamic thought can intersect with scientific inquiry, leading to a richer and more nuanced conversation.

In recent years, the field of Islam and Science has undergone significant diversification, with scholars from various disciplines contributing to a growing body of research.

Rather than providing a singular, settled view, the following sections highlight some of the major areas of engagement—how divine action is understood, the role of methodological naturalism, the nature of miracles, as well as contemporary debates on evolution, quantum physics, theological anthropology, and Islamic bioethics. These discussions remain open-ended, with scholars proposing various models, interpretations, and frameworks to address the complex relationship between Islam and modern science.

Divine Action Models

Divine Action Models (DAM) are theological frameworks that explore how God interacts with the world. At the core of this discussion are two fundamental considerations: the nature of God and the nature of creation. These ideas shape how divine agency is understood in relation to the natural order and human experience.

Divine Action Models (DAM) are theological frameworks that explore how God interacts with the world.

The first, the nature of God, examines how divine power, knowledge, and presence operate in the world. Some theological traditions emphasize that God's power is constantly exerted, guiding every detail of creation, while others maintain that God allows natural processes to

unfold according to established laws. This discussion also raises questions about miracles—whether they represent direct divine interventions that override natural laws or whether divine action is more subtle, working through those laws.

The second, the nature of creation, involves understanding whether the universe, once set in motion, operates independently or remains entirely dependent on God's ongoing sustenance. Some perspectives hold that creation follows a system of laws that God established but does not continuously intervene in, while others argue that the world cannot exist or function without God's constant will. This influences theological interpretations of natural disasters, human agency, and the extent of divine control over the unfolding of events.

When we consider how God interacts with the world, a spectrum of views emerges. At one end, some believe that God designed the universe, set it in motion, and allowed it to function independently through natural laws. This view, often associated with deism, sees God as a distant designer who no longer intervenes in creation.

Deism sees God as a distant designer who no longer intervenes in creation.

Moving along the spectrum, concurrentism proposes that God and natural causes operate together. While the world follows natural laws and processes, divine action is constantly present, sustaining and guiding these processes without necessarily suspending them. This perspective balances divine agency with the predictability of the natural world, viewing natural laws as instruments through which God acts continuously.

Concurrentism proposes that God and natural causes operate together.

At the other end of the spectrum, occasionalism holds that natural causes have no real power—everything occurs solely because of God's will. In this view, if a leaf falls from a tree, it is not because of gravity but because God wills it to fall at that exact moment. What we perceive as natural laws are simply patterns of divine action, with no independent causal power in creation.

These three models are not exhaustive, but they do represent some of the key positions in the discourse on divine action. Other perspectives exist, with some offering more nuanced views that combine elements from multiple models. However, for brevity, we have focused on these three to illustrate the debate's main contours.

Each perspective raises important questions: Does science describe how the world truly operates, or merely how God chooses to act? Are miracles exceptions to natural laws, or are natural laws themselves a reflection of God's continuous will? Exploring these questions helps bridge faith and reason in our understanding of the world.

Engaging with theological and philosophical traditions is crucial, as these models of divine action have been discussed extensively in both Islamic and broader intellectual contexts. Some scholars argue that classical theological concepts remain relevant and can be reinterpreted for contemporary debates in Islam and Science. Others believe that new frameworks are needed to address modern scientific and philosophical challenges. This debate continues to shape how divine action is understood, with some emphasizing God's detachment from creation, while others stress His continuous and direct involvement.

Methodological Naturalism

Methodological Naturalism (MN), a key principle in science, states that scientists should explain the world through natural causes without referring to the supernatural. The idea behind MN is that science

deals with what can be observed, measured, and tested—things like physical objects, natural processes, and cause-and-effect relationships in the natural world. But before diving into MN, it is helpful to contrast it with the Ontological Naturalism (ON) worldview, which is a different but related idea.

Methodological Naturalism (MN), a key principle in science, states that scientists should explain the world through natural causes without referring to the supernatural.

ON claims that everything that exists is part of the natural world—there is no room for anything supernatural—and that reality consists only of physical things governed by natural laws. If you are an ontological naturalist, you believe that nothing supernatural—such as God, angels, or miracles—exists. ON goes beyond science to make a statement about how reality itself works.

In contrast, MN makes no claim about whether supernatural things exist or not. Instead, it simply says that, for the purposes of doing science, we should stick to explaining things through natural causes. This means that when scientists study the world, they look for explanations that involve natural laws and processes, because they can test and observe such things.

Ontological Naturalism claims that everything that exists is part of the natural world—there is no room for anything supernatural.

MN is practical. It's like a rule that scientists follow: "If we can't measure it or observe it, we can't include it in our explanations." It doesn't say whether God or supernatural forces exist—only that science, by its nature, focuses on the natural world.

In the context of Islam and Science, ON is ruled out because it directly conflicts with core Islamic beliefs, such as the existence of God, angels, and miracles. As ON asserts that the natural world is all there is, the focus is largely on MN.

There are two main types of MN that are important to understand: Intrinsic Methodological Naturalism (IMN) and Provisional Methodological Naturalism (PMN).

IMN argues that science, by definition, can never deal with the supernatural because the nature of science to look only at the natural world. Given this, IMN suggests that science is inherently limited to studying only those things we can observe and test, so any supernatural explanation falls outside its scope. This is a more rigid stance.

PMN is a bit more flexible, for it argues that science has not needed to consider supernatural causes. PMN says that throughout history, natural explanations have worked well for understanding the world, so scientists do not need to invoke supernatural explanations. PMN leaves open the possibility that if a supernatural cause could be scientifically tested, it might be considered—but so far, that has not happened.

The debate between ON and MN (whether IMN or PMN) is important because it raises questions about the limits of science and what counts as a legitimate explanation. Some people argue that limiting science to natural explanations means that it might overlook important aspects of reality, especially if you believe in things like miracles or divine intervention. Others argue that sticking to natural causes is essential for making sure science remains focused on things we can test and observe.

For instance, in discussions about religion and science, someone who believes in ON might argue that science has already proven that

there is no need for supernatural explanations. Meanwhile, someone who supports MN might argue that science is simply about studying the natural world, leaving questions about the supernatural to philosophy or theology.

In the end,

Methodological Naturalism helps shape how we understand the world scientifically. It allows scientists to focus on finding reliable, testable explanations for natural phenomena, without getting into the tricky question of whether supernatural forces exist.

Miracles

The discussion of miracles naturally follows from the conversations about DAM and MN because it delves into the nature of divine intervention in the world. In Islamic theology, miracles hold a central place, often seen as signs of God's power and a way to affirm the truth of the prophetic message. Yet, the concept of miracles raises profound philosophical and theological questions, especially in light of modern scientific frameworks.

Miracles, in the Islamic tradition, are generally understood as extraordinary events that defy the natural order, performed by God through prophets and messengers as proof of their authenticity.

The Qurʾan recounts several miracles, such as Moses' parting of the Red Sea, Jesus' healing of the sick, and, most importantly, the revelation of

the Qur'an itself, which Muslims consider an enduring miracle. These miraculous events are considered direct divine interventions that surpass the normal cause-and-effect relationships found in the natural world.

Within the context of DAM, miracles present challenges to conventional understandings of how God interacts with creation. In models like concurrentism or occasionalism, miracles could be seen as moments when God temporarily alters the natural patterns without disrupting the creation's continuous dependence on the divine will. However, for models like deism, which hold that God does not intervene after setting the world in motion, miracles become problematic as they seem to contradict the model's premise of non-intervention.

The relationship between miracles and MN adds another layer of complexity. MN posits that science, by its very nature, investigates phenomena within the natural world using natural causes. According to IMN, science must completely exclude supernatural explanations, thereby placing miracles outside the domain of scientific inquiry. This presents a tension for believers, as IMN would treat miracles as either impossible or irrelevant to scientific explanation, both of which contradict religious teachings that affirm their reality.

An alternative approach is PMN, which allows for the possibility that some events—like miracles—might transcend natural explanation while maintaining that science can only investigate natural causes. PMN does not deny the possibility of miracles, but rather suggests that they lie beyond the scope of scientific methods. This approach acknowledges that while science provides significant insights into the workings of the natural world, it may not have the tools to fully explain or evaluate divine interventions.

In Islamic thought, miracles are not merely supernatural anomalies; they are profound signs of divine action. However, engaging with modern science brings about different interpretations. Some Muslim scholars uphold the traditional view, maintaining that miracles are

real, supernatural events that do not conflict with science because they fall outside the boundaries of scientific inquiry. This position aligns more with PMN, allowing for the coexistence of scientific investigation and the belief in divine action through miracles.

Others, more skeptical of miracles, suggest that the consistency of natural laws means that miracles either do not occur or are simply natural events that we do not yet fully understand. This approach, closer to IMN, downplays or reinterprets miraculous events to fit within the confines of naturalism. For instance, the parting of the Red Sea might be viewed not as a supernatural suspension of natural laws, but rather as a natural event divinely timed to aid Moses and his followers. This view seeks to preserve the theological significance of miracles while engaging with the naturalistic frameworks of science. This perspective may argue that traditional accounts of miracles are symbolic or allegorical, serving theological rather than historical purposes.

Ultimately, the conversation about miracles in the context of Islam and science illustrates a broader tension between the belief in divine action and the frameworks that underpin modern scientific inquiry.

For many Muslims, miracles serve as powerful evidence of God's active role in the world, reinforcing faith in divine providence. At the same time, these events challenge the boundaries of what science can explain, prompting ongoing debates about how religious belief and scientific inquiry should intersect when it comes to understanding the extraordinary.

Determinism and Indeterminism

The debate between determinism and indeterminism is fundamental to both science and philosophy, especially in terms of understanding the nature of the universe and how it operates. This debate is also deeply significant in the context of Islam and science, where questions about God's control over creation, free will, and the predictability of natural events are central. To explore this debate, it is helpful to contrast Newtonian mechanics with quantum mechanics, as these two scientific paradigms offer sharply different views on the orderliness and predictability of the universe.

Newtonian mechanics, developed by Sir Isaac Newton in the 17th century, is a deterministic framework. According to Newtonian physics, the universe operates like a well-ordered machine, governed by fixed, universal laws. If we know the state of a system at any given point in time—such as the position and velocity of objects—we can, in principle, predict their future states with absolute certainty. In other words, the past and present determine the future. This deterministic view gives a high level of predictability to the natural world, suggesting that once set in motion, the universe operates according to a strict cause-and-effect pattern.

Newtonian mechanics, developed by Sir Isaac Newton in the 17th century, is a deterministic framework.

The deterministic nature of Newtonian mechanics provided a powerful model for centuries, shaping scientific inquiry and influencing how people thought about the natural world. It seemed to affirm a highly ordered, predictable universe, one that could be understood completely through reason and observation. In the context of Islam and science, such a model could align with theological views that see God

as establishing a structured universe governed by divine laws. However, it also raises theological challenges: If everything is predetermined, what role does free will play in human action? Is there room for divine intervention or miracles within this fixed system?

Quantum mechanics thus presents a model that is inherently probabilistic rather than deterministic.

In the early 20th century, however, quantum mechanics emerged and fundamentally challenged the deterministic worldview. At the subatomic level, quantum mechanics introduces an element of indeterminism, suggesting that not all events in the universe are predictable. The behavior of particles, such as electrons and photons, is governed by probabilities rather than certainties. For example, the famous Heisenberg Uncertainty Principle states that it is impossible to know both the exact position and momentum of a particle simultaneously. This means that the future state of a quantum system can be predicted only with a certain probability.

Quantum mechanics thus presents a model that is inherently probabilistic rather than deterministic. This indeterminism suggests that at the deepest levels of reality, there is a degree of unpredictability. For many, this shift raises profound questions about the nature of causality and the extent to which the universe is knowable and controllable. In terms of Islamic theology, quantum indeterminism might seem to offer more flexibility in how one thinks about divine action and free will, since not everything is strictly predetermined by natural laws. It introduces a space in which God's will or human choices might interact with the natural world in ways that do not follow rigid, deterministic patterns.

However, the contrast between Newtonian determinism and quantum indeterminism is not just limited to these two scientific

frameworks. For instance, in the late 20th century chaos theory also challenged strict deterministic views. While chaos theory operates within deterministic systems (as in Newtonian mechanics), it shows that certain complex systems, like weather patterns, can be highly sensitive to initial conditions, leading to unpredictable outcomes. This is sometimes referred to as the "butterfly effect," where small changes can have large, unforeseen consequences. Though not indeterministic in the quantum sense, it does highlight the limits of predictability even within deterministic frameworks, further complicating the debate.

In the discourse of Islam and Science, the debate between determinism and indeterminism holds significant theological weight. Classical Islamic theology has long grappled with issues of divine control and human freedom, particularly in discussions of *qadar* (divine predestination) and human action. Deterministic models like Newtonian mechanics might support views that see the universe as entirely governed by God's fixed laws, but they also raise concerns about how to reconcile this with free will and moral responsibility. Quantum indeterminism, on the other hand, could be seen as offering a way to reconcile divine sovereignty with the existence of free will, allowing for a world in which not every event is fixed or predetermined.

The unpredictability of quantum mechanics might provide a way to think about divine action in a way that respects both natural laws and the possibility of miracles or divine intervention.

The intersection of determinism and indeterminism with theological concerns thus adds another layer of complexity to the broader dialogue between Islam and science. The unpredictability of quantum mechanics might provide a way to think about divine action in a way that respects both natural laws and the possibility of miracles or di-

vine intervention. Conversely, deterministic views continue to offer a vision of a highly ordered and purposeful universe that reflects divine wisdom. Ultimately, this debate is not only about the workings of the natural world, but also about how Muslims understand God's relationship with creation and the scope of human freedom within that divine plan.

Quantum Physics

Even though we touched on quantum mechanics earlier, it is worth highlighting how Basil Altaie, a leading scholar in this field, explores the connection between classical Islamic theology (*kalām*) and modern quantum physics. His work does not simply argue that Islam and science are compatible, but that Islamic theology can actively contribute to scientific discussions, particularly in terms of understanding the nature of matter and causality.

One of the key ideas he draws from *kalām* is that of *al-jawhar al-fard* (the indivisible particle). According to Ashʿarī atomism, all physical reality is made up of tiny, discrete building blocks that cannot be divided further. These particles exist only because God continuously recreates them at every moment. This idea was developed in response to Aristotelian physics, which assumed that matter could be infinitely divided.

Altaie argues that the classical Islamic concept of *al-jawhar al-fard* (the indivisible particle) strongly resembles what we now understand from quantum mechanics. Modern physics tells us that at the smallest scale, the universe is not infinitely divisible for matter is made up of quantized particles, meaning there is a fundamental limit to how small things can be. This aligns with *kalām*'s view that reality is made up of discrete units rather than continuous matter.

Altaie argues that the classical Islamic concept of *al-jawhar al-fard* (the indivisible particle) strongly resembles what we now understand from quantum mechanics.

Beyond this, Altaie also connects quantum mechanics to occasionalism. He takes this further by arguing that God does not just sustain the universe, but that God recreates it at every instant. This means that every moment of existence is contingent upon the divine will, which aligns with the probabilistic nature of quantum mechanics, where particles do not have fixed, determined trajectories but instead exist within a range of potential states.

Quantum mechanics challenges the classical Newtonian view that the universe follows strict, deterministic laws by introducing uncertainty: at a fundamental level, we cannot fully predict any particle's behavior. For example, the Heisenberg Uncertainty Principle shows that we can never know both its exact position and momentum at the same time. Altaie suggests that this uncertainty reflects the contingency of creation itself: Just as particles exist within a range of possibilities before being observed, so too does the created world only persist because God continuously chooses to sustain it at every moment.

This ongoing recreation aligns with *kalām*'s doctrine of atomic renewal (*tajdīd al-khalq*), which states that reality has no independent, continuous existence but is instead constantly renewed by divine action. Altaie's work suggests that this theological view finds support in quantum mechanics, where reality, at its most fundamental level, is both dynamic and contingent.

His approach is significant because it shows that Islamic theological concepts are not outdated or irrelevant. Instead of simply trying to make Islam fit within modern science, he argues that Islamic theology offers valuable insights that can help us understand deep philosophical questions in quantum mechanics, such as the nature of reality, causality, and

divine action. His work therefore encourages both scientists and theologians to engage in meaningful dialogue, rather than just seeing science and religion as opposing forces.

In this way, Islamic theology does not just accommodate modern science—it actively enriches it by providing fresh perspectives on some of the universe's most profound mysteries.

Evolution

Perhaps the most intense and heated discussion in the field of Islam and Science revolves around evolution. This is not only because evolution is a complex and multi-faceted theory, but also because it touches on several deeply significant aspects of Islamic theology and belief. Evolution raises questions about divine action, miracles, the origins of humanity, and the relationship between science and scripture. In essence,

> **The theory of evolution brings together many of the most challenging areas of debate in the interaction between faith and reason.**

Additionally, evolution has become a focal point for polemics, particularly through the lens of the New Atheism. Figures in this movement have often used this theory as a weapon to challenge religious belief, arguing that it provides a naturalistic explanation for the origins of life that leaves no room for divine creation. This has only intensified the debate within the Muslim world, where some view the theory of evolution as a direct threat to core Islamic doctrines, especially those concerning human origins and the role of God as the creator of all life.

These tensions make the conversation especially charged, as it is not merely an academic debate but a matter that strikes at the heart

of religious belief, identity, and the broader discourse between science and religion.

Evolution, as a scientific theory, provides an explanation for how life on Earth has changed and diversified over time. To understand it, we can break it down into three key concepts: deep time, common ancestry, and the mechanisms of evolution.

Deep time refers to the vast, almost unimaginable span of time over which evolution takes place. Earth is about 4.5 billion years old, and life began around 3.5 billion years ago. Evolution is not a rapid process; it occurs gradually, over millions and even billions of years. This extended period of time allows for small changes in organisms to accumulate, eventually leading to the formation of new species. Deep time is crucial to evolutionary theory because it provides the framework in which these slow, gradual changes occur, leading to the diversity of life we see today.

Common ancestry is the idea that all living organisms share a common origin. According to evolutionary theory, all species that exist today are descended from earlier forms of life. If we trace the evolutionary history of any species far enough back, we find that all life forms—whether humans, animals, plants, or even microorganisms—are related through a common ancestor. This concept helps explain the similarities we see among different species, even if they appear vastly different today.

The mechanisms of evolution explain how these changes happen over time. The two main forces driving it are random mutations and natural selection. Mutations are random changes in an organism's DNA, and while many of them have no effect, some can lead to new traits that might give an organism an advantage in its environment. Natural selection, on the other hand, is the process by which organisms with traits that are better suited to their environment are more likely to survive and reproduce. Over time, these advantageous traits become more common within a population. Together, mutations

provide the raw material for evolution, and natural selection acts as the mechanism that determines which traits will be passed on.

Scientists use these three principles to explain how species change and adapt to their environments, leading to the wide diversity of life that has evolved on Earth over billions of years.

In the Muslim discourse surrounding evolution, scholars have articulated various positions that engage differently with this scientific theory, particularly regarding human origins. These positions, ranging from outright rejection to more integrative approaches, reflect diverse theological interpretations and priorities.

The four main Muslim positions on the theory of evolution are Creationism, Human Exceptionalism, Adamic Exceptionalism, and No Exceptions.

Creationism represents the most direct rejection of evolutionary theory, particularly concerning human beings. Advocates hold that all species, including humans, were created by God in their present form without any evolutionary process. This perspective is grounded in a literal interpretation of religious texts, such as the Qur'an, which describe the creation of Adam and all living creatures as immediate acts of divine will. Creationists often argue that evolutionary theory, especially the idea that humans share a common ancestry with other animals, contradicts these scriptural narratives. This position tends to reject the findings of modern science on evolution and maintains that human beings, and all other forms of life, are the result of distinct and direct acts of creation.

Human Exceptionalism, while more accommodating of evolution, still upholds a unique status for humans. This position accepts the evolutionary development of all other species, but asserts that humans were created separately and thus do not share a common ancestry with other animals. Human Exceptionalism allows for the possibility

that God used evolutionary processes to bring about the diversity of animal and plant life, but insists that humans are a special creation, one distinct from the evolutionary chain. The creation of humans, particularly Adam, is viewed as a unique divine act that cannot be explained by natural processes. This position seeks to reconcile aspects of evolutionary theory with Islamic teachings, but maintains a firm boundary around human origins.

The No Exceptions position represents the most integrative stance.

Adamic Exceptionalism builds on the acceptance of human evolution while preserving a special theological status for Adam. Proponents of this view accept that early humans or hominins may have evolved through natural processes, but argue that Adam (and Eve), was uniquely created by God. Adamic Exceptionalism, as opposed to Human Exceptionalism, allows for the possibility that Adam's descendants may have intermingled with other hominins, thus placing Adam within an evolutionary framework but still marking his creation as a special, divine intervention. Adam's creation is viewed as a key theological event that introduces a break from the purely natural processes of evolution. This position opens up the possibility of integrating evolutionary theory with the Qurʾanic narrative while maintaining a significant role for divine action in the first human being's creation.

Arguing that there is no inherent contradiction between evolutionary theory and Islamic teachings, the No Exceptions position suggest that the Qurʾanic creation narratives should be understood metaphorically or allegorically. For them, God used evolution to bring about all life's diversity of life.

The No Exceptions position represents the most integrative stance, for its adherents fully embrace the idea that human beings, like all other forms of life, are the product of evolution through common ancestry. Arguing that there is no inherent contradiction between evolutionary theory and Islamic teachings, they suggest that the Qur'anic creation narratives should be understood metaphorically or allegorically. For them, God used evolution to bring about all life's diversity of life. God's guidance and will are seen as operating through natural processes, and evolution is understood as a manifestation of divine order. This view emphasizes Islamic theology's flexibility and ability to accommodate scientific knowledge, proposing that the faith can evolve alongside new discoveries without losing its spiritual core.

Each of these positions reflects a different way of engaging with the tension between Islamic theology and the scientific understanding of human origins. The ongoing debate within the Muslim world regarding evolution highlights the diversity of thought on how best to reconcile religious belief with modern science, particularly when it comes to the creation and uniqueness of human beings.

Theological Anthropology

Theological Anthropology, one of the newest developments in the field of Islam and Science, is the study of human nature and uniqueness in relation to God and creation from a theological perspective. It emerged as recent advancements in various scientific fields compelled theologians to engage with new and complex questions about human nature and its place in the universe. It addresses fundamental questions such as: What does it mean to be human? What makes humans distinct from other creatures? In Islamic theology, humans are considered the pinnacle of God's creation, endowed with reason

(*ʿaql*), free will (*ikhtiyār*), and a special status as vicegerent (*khalīfa*) on Earth? The Qurʾan highlights this unique role by emphasizing the human capacity for moral judgment, responsibility, and spiritual growth. Central to Islamic theological anthropology is the notion that humans are created by God with a purpose, namely, to worship and serve Him, and are endowed with both physical and spiritual qualities that set them apart from the rest of creation.

Theological Anthropology is the study of human nature and uniqueness in relation to God and creation from a theological perspective.

As new scientific and technological developments continue to unfold, several emerging areas challenge or invite reinterpretation of this classical understanding. Among them, evolution, AI, and the possibility of extraterrestrial intelligence have introduced new complexities to Islamic theological anthropology.

Evolution presents a challenge by calling into question the traditional understanding of human origins. While Islamic teachings assert that humans were created directly by God, evolution posits that humans share a common ancestry with other species through gradual biological processes that have occurred over millions of years. This tension raises profound theological questions. For example, if humans evolved from earlier species, how do we reconcile this with the Qurʾanic notion of humans being specially created by God? Moreover, what does this mean for the their *khalīfa* status if our ancestors were part of the animal kingdom? In particular, the idea that human traits such as reason and moral agency could have evolved gradually challenges the view that these qualities were divinely imparted and unique from the outset.

AI, although a more recent development, also presents significant challenges to Islamic theological anthropology. As AI systems

become increasingly sophisticated, some question whether machines could eventually exhibit qualities like reasoning, decision making, and even moral judgment—traits traditionally seen as uniquely human. Islamic theology traditionally views intellect and free will as divinely granted attributes that distinguish humans from animals and other beings. AI forces theologians to ask: If machines can replicate human cognitive abilities, how do we define human uniqueness? Can a machine that processes data and make decisions in complex, human-like ways ever be considered morally responsible or spiritually accountable? While AI cannot possess a soul or consciousness in the way humans do, or at least as far as our current conceptions go, its increasing capacities demand a reevaluation of what it means to be human in a world where machines can mirror human-like behavior.

As AI systems become increasingly sophisticated, some question whether machines could eventually exhibit qualities traditionally seen as uniquely human.

Extraterrestrial intelligence is another frontier that challenges Islamic theological anthropology. If intelligent life were to be discovered elsewhere in the universe, it would raise questions about human exceptionalism in creation. The Qurʾan refers to the vastness of the cosmos and the multiplicity of God's creations, which has led some scholars to suggest that the existence of other sentient beings is possible within Islamic theology. However, the discovery of intelligent extraterrestrial life would force theologians to reconsider humanity's role as God's chosen *khalīfa* on Earth. Would these other beings have their own moral and spiritual responsibilities? How would they fit into the divine plan, and what would be the relationship between humans and these other intelligent creatures? Such questions extend theological anthropology beyond Earth and challenge the boundaries of human uniqueness.

In each of these three cases, the essential challenge to Islamic theological anthropology lies in redefining what makes humans unique in a universe that increasingly appears to be populated by other forms of intelligence, whether natural or artificial. These debates invite a deeper engagement with classical theological concepts and a reflection on how they can be adapted to account for the realities of modern science and technology.

Islamic Bioethics

The evolving and complex field of Islamic bioethics seeks to address the ethical challenges posed by modern biomedicine within the framework of Islamic law and theology.

As medical technologies rapidly advance, issues like organ transplantation, genetic engineering, reproductive technologies, and end-of-life care have become central to these debates in the Muslim world. Drawing from both classical Islamic sources and contemporary scholarship, this field grapples with how to apply religious principles to new medical realities in ways that uphold human dignity, balance moral obligations, and respect the sanctity of life.

At the core of Islamic bioethics are key concepts derived from the Qurʾan, the Sunnah (the sayings and practices of Prophet Muhammad), and centuries of Islamic jurisprudence (*fiqh*). These sources provide ethical principles that guide decision making in the face of biomedical challenges. Among these principles are *maṣlaḥa* (the consideration of public benefit), *ḍarūra* (necessity), *maqāṣid al-sharīʿa* (the objectives of Islamic law), and preventative measures

(*sadd al-dharīʿa*). These guide rulings on complex issues while allowing some flexibility depending on context.

One of the most highly debated topics in Islamic bioethics is the permissibility of reproductive technologies such as in-vitro fertilization (IVF), surrogacy, and genetic screening. The desire for offspring is emphasized in Islamic tradition, and infertility is often seen as a profound challenge for Muslim couples. The use of IVF is generally permissible as long as it involves the husband and wife's genetic material. However, surrogacy, particularly involving third parties, is widely rejected due to concerns about lineage (*nasab*) and the potential for disrupting family structures that are foundational in Islamic law.

One of the most highly debated topics in Islamic bioethics is the permissibility of reproductive technologies

Genetic screening and genetic modification also pose ethical dilemmas. Pre-implantation genetic diagnosis (PGD) is often accepted if it prevents the transmission of serious genetic disorders. But concerns arise over the use of such technologies for non-medical purposes, such as selecting traits like intelligence or gender. Scholars grapple with balancing the potential benefits of genetic modification against the risks of interfering with God's creation (*khalq Allāh*).

End-of-life care is another critical area where scholars debate the permissibility of withdrawing or withholding life-sustaining treatment in terminal cases. Islamic principles emphasize the sanctity of life, and thus the default position is to preserve life whenever possible. However, Islamic law allows for a nuanced understanding of the difference between prolonging life and prolonging the dying process.

Many scholars argue that if medical treatment becomes futile and only extends the patient's suffering, it is permissible to allow death to take its natural course.

The use of technologies like ventilators, feeding tubes, and other life-support measures is evaluated in terms of the quality of life they offer and the likelihood of recovery. In many Islamic rulings, what matters is whether the treatment protects life (*ḥifẓ al-nafs*) or unnecessarily prolongs suffering. Euthanasia and assisted suicide, however, are categorically prohibited across all Islamic legal schools.

Organ transplantation is another area that has provoked extensive bioethical discussion. Initially, many Islamic jurists were opposed to the practice due to concerns over the sanctity of the human body, particularly after death. However, most scholars today, particularly those affiliated with large Islamic councils like the Islamic Fiqh Academy, permit it under certain conditions. These include the necessity of saving a life, ensuring that no harm is done to the donor, and obtaining the donor or the family's consent.

One area of contention is the definition of death.

Islamic scholars have debated whether brain death constitutes true death under Islamic law, as traditional definitions of death revolve around the cessation of the heart and breathing. While some scholars accept brain death as valid, others argue that the body's physical processes, such as heartbeat, must also cease for death to be confirmed.

The ethical boundaries of genetic engineering and cloning are less settled in Islamic bioethics, given the relatively recent emergence of these technologies. In general, scholars are cautious about this procedure, particularly when it involves altering human germ lines or

creating genetically modified organisms (GMOs). The main concern here is to preserve human dignity and ensure that human intervention does not overstep divine prerogatives. Scholars distinguish between therapeutic interventions that aim to correct genetic defects and those that aim to enhance certain human traits, with the latter often seen as problematic.

Cloning, particularly human cloning, is widely condemned by Islamic scholars as a violation of the natural order of creation.

The fear is that this undertaking could lead to unforeseen consequences that disrupt family structures and human identity, both of which are deeply rooted in Islamic ethics.

Islamic bioethics operates within a global, multi-disciplinary context. Various *fiqh* councils and bioethics bodies, such as the Islamic Fiqh Academy (a body under the Organization of Islamic Cooperation), regularly convene to deliberate on bioethical matters. These councils often collaborate with medical professionals, scientists, and legal experts to develop guidelines that reflect the values of Islamic law while addressing contemporary medical issues.

Saudi Arabia, Iran, Malaysia, and other countries have incorporated Islamic bioethics into their healthcare systems, influencing both public health policies and laws. For example, Saudi Arabia's religious scholars have played an instrumental role in shaping policies around organ transplantation and reproductive health, ensuring that they are in line with Islamic principles.

In Western contexts, where Muslims are often minorities, there is a growing demand for bioethics frameworks that respect both religious and secular principles. Islamic bioethicists such as Aasim Padela and Mansur Ali, among others, have contributed significantly to bridging these worlds, advocating for policies that respect Islamic norms while

engaging with the broader bioethical discourse. Conferences, research initiatives, and academic journals now provide platforms for discussing Islamic bioethics in global forums, offering a way for Muslim scholars and physicians to address the moral complexities of biomedicine.

The future of Islamic bioethics will likely involve further collaboration between religious scholars, medical professionals, and bioethicists.

One of the ongoing challenges here is balancing tradition with the rapidly evolving landscape of medical technology. As advancements like CRISPR, AI in healthcare, and synthetic biology emerge, Islamic scholars face the task of determining how to apply classical ethical frameworks to unprecedented scenarios. This involves not only interpreting legal texts, but also engaging with medical experts to fully understand the implications of new technologies.

There is also a growing conversation around the role of Islamic bioethics in global bioethical discussions. As bioethical issues become more interconnected across borders, Islamic scholars are increasingly engaging with broader ethical frameworks, such as the Universal Declaration on Bioethics and Human Rights, to find common ground while upholding Islamic values.

Islamic bioethics remains a field in development, but its importance is undeniable. As Muslim societies continue to encounter complex bioethical dilemmas, the need for thoughtful, well-informed engagement with both Islamic tradition and modern science will only increase. The future of Islamic bioethics will likely involve further collaboration between religious scholars, medical professionals, and bioethicists, thereby ensuring that ethical guidance remains relevant in an age of rapid technological change.

Conclusion

This sweeping review of the contemporary landscape shows how diverse and dynamic the field of Islam and Science has become, with scholars tackling issues that range from theoretical physics and ethics to evolution, extraterrestrial life, and the interpretation of Qur'anic miracles. As the field continues to grow, it is supported by an increasingly robust intellectual infrastructure.

A key part of this development is the expansion of dedicated academic resources. Cambridge University Press's *Elements in Islam and the Sciences* series, the first micrograph series dedicated to the field, offers concise and accessible studies that introduce key debates and emerging discussions. Meanwhile, Palgrave Macmillan has launched the first full-length monograph series and encyclopedia on Islam and Science, providing in-depth scholarly treatments of major topics and serving as a foundational reference for researchers. These initiatives mark a significant step in establishing Islam and Science as a rigorous area of inquiry, ensuring that scholars have the necessary academic infrastructure to develop the field further.

Despite these advancements, however, institutional support for Islam and Science remains uneven. The broader field of Science and Religion, shaped largely by Christian theological concerns since the 1960s, has benefited from a well-established academic infrastructure, including dedicated research centers and multiple comprehensive textbooks. In contrast, Islam and Science has only recently begun to develop such resources. Both the Ian Ramsey Centre at the University of Oxford and the University of Edinburgh have emerged as leading hubs for research in Science and Religion, providing spaces for scholarly engagement with Islam and Science. However, Edinburgh has taken a key step forward by not only incorporating Islam and Science into its MSc in Science and Religion—offered both online and in-per-

son—but also by establishing dedicated PhD supervision in this area. This marks a major development in the field's institutional growth, ensuring that future scholars can pursue structured academic training in Islam and Science at an advanced level.

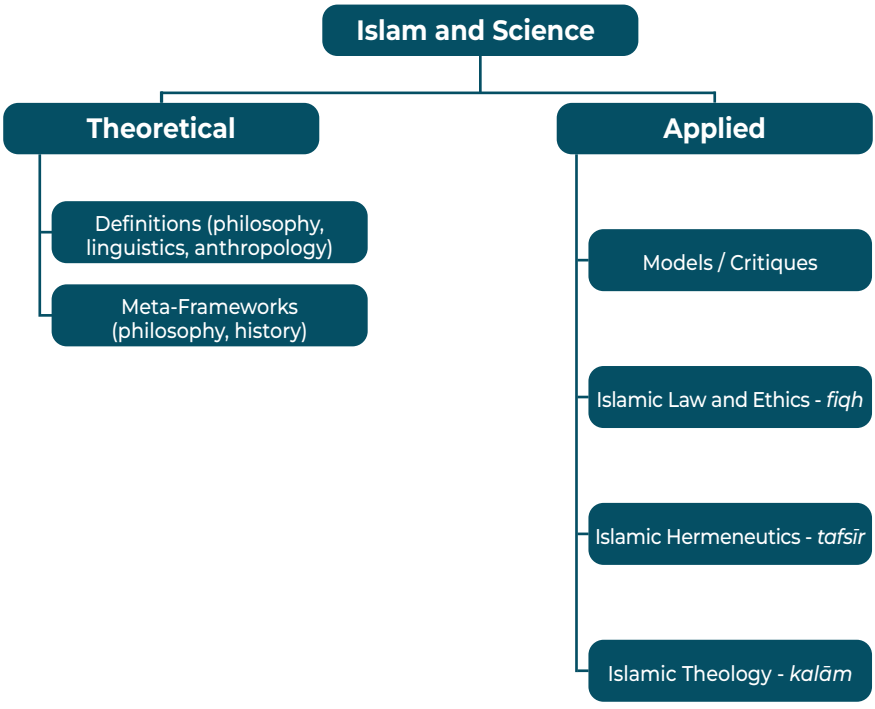
As the field continues to grow, the challenge remains to deepen engagement with both Islamic theological traditions and contemporary scientific inquiry, bridging gaps among historical scholarship, modern scientific thought, and the lived realities of Muslim communities.

While Islam and Science is still in the process of defining its boundaries, the increasing academic infrastructure, institutional recognition, and growing body of scholarship signal that it is set to become an increasingly vital area of study within the broader discourse on science and religion.

Annotated Bibliography

This semi-annotated bibliography lists the most critical books that have come to define the field of Islam and Science. It also lists recent journal articles (published since the year 2000) to offer the most updated research in this field. Journal publications are selected from *Zygon, the Journal of Religion and Science* and *Theology and Science* (Taylor and Francis). Editorials and book reviews are excluded.

The bibliography employs a practical framework for organizing existing publications. It separates between theoretical and applied works. Applications and critiques of theoretical models are given their own category. Other applied works are differentiated by their area of engagement with traditional Islamic sciences, namely: law and ethics (*fiqh)*, hermeneutics (*tafsīr)*, and theology (*kalām)*. The five categories are as follows:



1. Definitions and Theories of Islam and Science (8 books; 12 articles)
2. Applied Models of Islam and Science (4 books; 16 articles)
3. Applied Islamic Law and Ethics (*fiqh*) (2 books; 15 articles)
4. Applied Islamic Hermeneutics (*tafsīr, hadīth)* (3 books; 13 articles)
5. Applied Islamic Philosophy and Theology (*kalām, aqīda*) (7 books; 9 articles)

1. Definitions and Theoretical Models of Islam and Science

Several books offer a broad overview of the relationship between Islam and science by taking a historical approach (Dallal, Golshani, Guessoum, Iqbal, Saliba), with one taking a closer look at definitions of Islam (Bigliardi) and another focusing on modern technology and the environment (Nasr). In addition, several journal articles offer a discussion on the importance of having a common language and definitions (Feyzbakhsh, Hossein Khani), while others critique given definitions of Islam (Yalçinkaya). Others offer critiques of given models, such as the 'theistic science' of Guessoum (Hameed) and the 'value-free science' found in Stenmark's comments (Taebnia), and the science/theism of Tzortzis' (Bigliardi). Other significant factors influencing our understanding of Islam and science include distinguishing between mainstream/reformist Islam (Çoruh), historical approaches to interpreting scripture and science (Daneshgar, Malik, Yazicioglu) and the role of apologetics and the secular study of religion (Drees).

Books

Muhammad, Bigliardi, S. (2014). *Islam and the Quest for Modern Science: Conversations with Adnan Oktar, Mehdi Golshani, Mohammed Basil Altaie, Zaghloul El-Naggar, Bruno Guiderdoni and Nidhal Guessoum.* Türkiye: Swedish Research Institute in Istanbul.

Many interpretations regarding issues in human life display a plurality of opinions on the 'true' meaning of Islam. *Islam and the Quest for Modern Science* is an excellent introduction to questions that can be understood either as a challenge, a threat or a possibility.

Dallal, A. S. (2010). *Islam, Science, and the Challenge of History.* United States: Yale University Press.

Dallal examines the significance of scientific knowledge and situates the culture of science in relation to other cultural forces in Muslim societies. He traces the ways in which the realms of scientific knowledge and religious authority were delineated historically.

Golshani, M. (2021) *Science and Religion, In a Monotheistic Perspective*. Safir Ardehal Publisher.

Guessoum, N., & Bigliardi, S. (2023). *Islam and Science: Past, Present, and Future Debates.* Cambridge: Cambridge University Press.

This first Element in the series *Islam and the Sciences* is introductory and gives a general overview of the wide and rich scope of interactions of Islam with the sciences, including past disputes, current challenges, and future outlooks. The Element introduces the main voices and schools of thought, adopting a historical approach to show the evolution of the debates.

Iqbal, M. (2007). *Science and Islam*. United Kingdom: Bloomsbury Publishing.

Science and Islam provides a detailed account of the relationship between Islam and science from the emergence of the Islamic scientific tradition in the eighth century to the present time. This relationship has gone through three distinct phases.

Iqbal, M. (2017). *Contemporary Issues in Islam and Science: Volume 2*. United Kingdom: Taylor & Francis.

The articles selected for this volume explore emergent issues in the contemporary relationship between Islam and science and present studies of eight major voices in the discourse. Also included is a section on the operationalization of Islamic science in the modern world and a section on studies in traditional Islamic cosmology.

Nasr, S.H. (2007). *Islam, Science, Muslims, and Technology*. Islamic Book Trust (theory)

In four focused conversations Seyyed Hossein Nasr responds to Muzaffar Iqbal in exploring Islamic views on the origin of the cosmos and life, Muslim attitudes toward modern science and technology, and the environmental crisis.

Saliba, G. (2011). *Islamic Science and the Making of the European Renaissance*. United Kingdom: Penguin Random House.

In this thought-provoking and original book, George Saliba argues that, contrary to the generally accepted view, the foundations of Islamic scientific thought were laid well before Greek sources were formally translated into Arabic in the ninth century.

Articles

Bigliardi, S., (2024) "The Half-Baked Loaf: Reflections on Hamza Andreas Tzortzis' Discussion of Science in The Divine Reality", *Zygon: Journal of Religion and Science* . doi: https://doi.org/10.16995/zygon.11597

This article scrutinizes the conceptualization of science advanced by Hamza Tzortzis, arguing that Tzortzis' work suffers from six major and intertwined problems related to the consistency and accuracy of the epistemological framework within which he defends theism.

Çoruh, H. (2020). Relationship Between Religion and Science in the Muslim Modernism. *Theology and Science, 18*(1), 152–161. 10.1080/14746700.2019.1710355

This work argues that Sayyid Ahmed Khan and Muhammad Abduh represent a modernist and reformist approach, while Said Nursi represents a more mainstream Sunni approach.

Daneshgar, M., (2023) "The Qurʾān and Science, Part I: The Premodern Era", *Zygon: Journal of Religion and Science* 58(4), 952–969. doi: https://doi.org/10.1111/zygo.12931

This work articulates how Muslim theologians have historically employed Qurʾānic scientific interpretation and scientific miracles discourse to ensure a close relationship between theology and scientific knowledge.

Daneshgar, M., (2020) "The Future of Islam and Science: Philosophical Grounds", *Zygon: Journal of Religion and Science* 55(4), 971–976. doi: https://doi.org/10.1111/zygo.12647

This work compiles articles by philosophers, Islamicists and historians to provide philosophical grounds for the relationship between religion and science.

Drees, W., (2005) ""Religion and Science" As Advocacy of Science and As Religion Versus Religion", *Zygon: Journal of Religion and Science* 40(3),545–554.doi: https://doi.org/10.1111/j.1467-9744.2005.00686.x

This work articulates the role of apologetics, the secular study of religion, and intrareligious competition (revisionist vs. traditionalist) in shaping religion and science discourse.

Feyzbakhsh, M., (2020) "Theorizing Religion and Questioning the Future of Islam and Science", *Zygon: Journal of Religion and Science*55(4), 996–1010. doi: https://doi.org/10.1111/zygo.12648

This work investigates the future of science and Islam by asking whether the concept of religion denotes real objects, and whether it is universal and belief centered. It also considers how "inference to the best theological explanation" influences the definition of religion.

Hameed, S., (2012) "Walking the Tightrope of The Science and Religion Boundary", *Zygon: Journal of Religion and Science* 47(2), 337–342. doi: https://doi.org/10.1111/j.1467-9744.2012.01258.x

This work evaluates Nidhal Guessoum's approach to reconciling modern science and Islam, arguing that while Guessoum successfully establishes a clear boundary for science and scientific methodology, his project for a 'theistic science' is contentious.

Hossein Khani, A., (2020) "Islam and Science: The Philosophical Grounds for A Genuine Debate", *Zygon: Journal of Religion and Science*55(4), 1011–1040. doi: https://doi.org/10.1111/zygo.12646

This work identifies the importance of a developing a common language and having a shared meaning of theoretical terms in order for conversations in science and Islam to move past trivial and superficial levels, and to permit genuine debate.

Malik, S. A. (2023c). Introduction to the Special Issue on Philosophy of Science and Islamic Thought. *Theology and Science, 21*(3), 354–358. 10.1080/14746700.2023.2230425

This introduction provides the historical context of Islam and science, for a special issue on a conference held at the Cambridge Muslim College in December 2022.

Taebnia, V. (2022). Fundamental Scientific Theories and the Problem of Metaphysical Impartiality: Comments on Stenmark's Response to Golshani. *Theology and Science, 20*(4), 463–473. 10.1080/14746700.2022.2124482

This work examines Stenmark's example of an impartial fundamental science (value-free science) and assesses his notion of "religiously relevant science" from an Islamicate philosophical perspective.

Yalçinkaya, M., (2019) ""Science," "Religion," And "Science-And-Religion" In the Late Ottoman Empire", *Zygon: Journal of Religion and Science* 54(4), 1050–1066. doi: https://doi.org/10.1111/zygo.12563

This work features the work of late Ottoman-Empire authors in shaping the science and religion harmonization narrative. This paper traces the development of a 'pure Islam' as an objectified entity, distinct from Islam as an embedded way of life.

Yazicioglu, I. (2013). Perhaps Their Harmony is not that Simple: Bediuzzaman Said Nursi on the Qur'an and Modern Science. *Theology and Science, 11*(4), 339–355. 10.1080/14746700.2013.836888

This work explores Said Nursi's view on the problem of authoritarianism in religious and secularist discourses. It concludes that the task of relating modern science and the Qur'ān requires attention to their interpretive dimensions.

2. *Applied Models of Islam and Science*

Three books take an applied approach to understanding the relationship between religion and science, with focuses on human anthropology (Howard), engagement with models of harmony and conflict (Edis), and theological implications of common topics in science (Guessoum). Ross Solberg focuses on the implications of the approach taken by Harun Yahya. In the journal articles, Guessoum's thesis of a "theology of nature" is applied and developed by Bagir and Dajani. Others critically apply earlier models, such as Stenmark's, Peters', and Barbour's, to engage with recent authors on Islam and science (Bigliardi, Shamsai). With an eye toward the future, several authors analyze the implications of Shoaib Ahmed Malik's work on *Islam and Evolution* (Burney, Kojonen, and Swamidass). The implications of different works on future interreligious dialogue, especially between Islam and Christianity, is also well-covered (van den Brink, Moore, Sharpe, and Stenmark).

Books

Edis, T. (2010). *An Illusion of Harmony: Science and Religion in Islam.* United States: Prometheus.

> Current discussions in the West on the relation of science and religion focus mainly on science's uneasy relationship with the traditional Judeo-Christian view of life. But a parallel controversy exists in the Muslim world regarding ways to integrate science with Islam.

Guessoum, N. (2018). *The Young Muslim's Guide to Modern Science.* United Kingdom: Beacon Books.

> This book presents a wide range of topics, from the Big Bang to genetic engineering, in simple, clear, and scientifically accurate language, but also showing the Muslim or religious reader how this all fits with his/her beliefs and cultural background.

Howard, D. (2011). *Being Human in Islam: The Impact of the Evolutionary Worldview*. United Kingdom: Taylor & Francis.

Islamic anthropology is relatively seldom treated as a particular concern even though much of the contemporary debate on the modernisation of Islam makes implicit assumptions about the way Muslims conceive of the human being. This book explores how the spread of evolutionary theory has affected the beliefs of contemporary Muslims regarding human identity, capacity and destiny.

Ross Solberg, A. (2013). *The Mahdi Wears Armani: An Analysis of the Harun Yahya Enterprise.* Sweden: Södertörn University. (APP Model)

This work describes, analyzes and contextualizes four key themes in the works of Harun Yahya, namely conspiracy theories, nationalism/neo-Ottomanism, creationism and apocalypticism/Mahdism.

Articles

Bagir, Z., (2012) "Practice and The Agenda Of "Islam and Science", *Zygon: Journal of Religion and Science* 47(2), 354–366. doi: https://doi.org/10.1111/j.1467-9744.2012.01260.x

This work expands upon Guessoum's examination of theological responses to particular scientific theories by addressing how assertions of authority are made in practice. It includes theological responses to particular events, such as natural disasters.

Bigliardi, S. (2014). "Stenmark's Multidimensional Model and the Contemporary Debate on Islam and Science", *Theology and Science, 12*(1), 8–29. 10.1080/14746700.2013.868117

This work argues that Stenmark's model enlightens the theories of four Muslim authors (al-Faruqi, Nasr, Golshani, and Guessoum) once some corrections are applied to it.

Bigliardi, S., (2012) "Barbour's Typologies and The Contemporary Debate on Islam and Science", *Zygon: Journal of Religion and Science* 47(3), 501–519. doi: https://doi.org/10.1111/j.1467-9744.2012.01269.x

This work reviews the work of Barbour, al-Faruqi, Nasr, Golshani, and Guessoum to defend Barbour's parallel model for integration between religions.

Bigliardi, S., (2011) "Snakes from Staves? Science, Scriptures, And the Supernatural in Maurice Bucaille", *Zygon: Journal of Religion and Science* 46(4), 793–805. doi: https://doi.org/10.1111/j.1467-9744.2011.01218.x

This work evaluates the work of Maurice Bucaille, who developed the genre of the "scientific miracles" of the Qur'ān. It highlights a severe methodological flaw in Bucaille's analysis of miraculous and supernatural events.

Burney, S. F. (2023). "Shoaib Malik's 'Islam and Evolution': Sociological Reflections on the Developing Engagement of British Muslim Leadership with Science", *Theology and Science, 21*(4), 696–707. 10.1080/14746700.2023.2255952

This work argues that Shoaib Malik's work on Islam and evolution indicates a shift in Muslim leadership toward informed engagement with science/religion topics.

Dajani, R., (2012) "Evolution and Islam's Quantum Question", *Zygon: Journal of Religion and Science* 47(2), 343–353. doi: https://doi.org/10.1111/j.1467-9744.2012.01259.x

Building from Nidhal Guessoum's narrative on evolution, this work explains the apparently contradictory relationship between Islam and evolution. It cites the lack of freedom of thought and misinterpretation of the Qur'ān as the primary reasons.

Guessoum, N., (2012) “Issues and Agendas of Islam And Science”, *Zygon: Journal of Religion and Science* 47(2), 367–387. doi: https://doi.org/10.1111/j.1467-9744.2012.01261.x

This work provides updates on the “miraculous scientific content in the Qur’ān,” Muslim creationism, and the Arab Spring. It highlights the relationship between religion and science in practice, arguing for a “theology of nature” instead of a natural theology of Islam.

Guessoum, N., (2015) “Islam and Science: The Next Phase of Debates”, *Zygon: Journal of Religion and Science* 50(4), 854–876. doi: https://doi.org/10.1111/zygo.12213

This work reviews the most recent developments in the field of Islam and science, including the emergence of the “harmonization” of modern science with Islam.

Kojonen, E. V. R. (2023). "Divine Design and the Creation-Evolution Debate as Questions for Christian-Muslim Dialogue", *Theology and Science,* 21(4), 660–677. 10.1080/14746700.2023.2255950

This article responds to Shoaib Malik’s four ʿAshʿarī criticisms of the design argument and builds upon his analysis of theological hermeneutics.

Moore, J., (2005) “Interreligious Dialogue as An Evolutionary Process”, *Zygon: Journal of Religion and Science* 40(2), 381–390. doi: https://doi.org/10.1111/j.1467-9744.2005.00670.x

This work examines Ebrahim Moosa’s contributions for an authentic Muslim-Christian dialogue on religion and science. His approach, beginning from the Islamic legal tradition, offers an alternative model for a religion-science dialogue.

Shamsaei, M. (2023). "A Comparative Study of Three Contemporary IranianMuslim Thinkers in Science and Religion, with an Emphasis on Ted Peters' Views", *Theology and Science, 21*(2), 315–330. 10.1080/14746700.2023.2188376

This reviews the works of Seyyed Hossein Nasr, Morteza Motahhari, and Mehdi Bazargan using Ted Peters' model.

Shamsaei, M. "The Confrontation Between Science and Religion from the Perspective of Mehdi Golshani and Ted Peters", *Theology and Science*, 1–12. 10.1080/14746700.2024.2359192

This work examines the models of confrontation between science and religion offered by Ted Peters and Mehdi Golshani.

Stenmark, M. (2005). "A Religiously Partisan Science? Islamic and Christian Perspectives"„ *3*(1), 23–38. 10.1080/1474 6700500039594

This work compares the works of Mehdi Golshani and Alvin Plantinga, to identify the different ways in which religion can enter the fabric of science.

Swamidass, S. J. (2023). "Advancing Evolutionary Science in Dialogue with Islam", *Theology and Science, 21*(4), 642–659. 10.1080/14746700.2023.2255949

This work evaluates Shoaib Ahmed Malik's theology-centric approach toward evolution in terms of how it will shape future dialogue on Islam and science.

Sharp, J., (2021) "Theistic Evolution in Three Traditions", *Zygon: Journal of Religion and Science* 56(4), 1045–1057. doi: https://doi.org/10.1111/zygo.12743

This work examines the role of theistic evolution in the work of three scholars from Christian, Jewish and Muslim backgrounds. It finds potential for popular discourse on science and religion moving beyond the categories of conflict and independence or isolation.

Van den Brink, G. (2023). "Issues on Evolution in Christianity and Islam: A Comparison", *Theology and Science, 21*(4), 678–695. 10.1080/14746700.2023.2255951

This work responds to Shoaib Malik's *Islam and Evolution* by comparing Christian and Muslim views on six perceived conflicts between neo-Darwinian evolution and religion.

3. Applied Islamic Law and Ethics (fiqh)

Two books take an applied ethics approach: one focuses on end-of-life care (Ghaly), and one is dedicated to contemporary issues in Islamic bioethics (Padela). For journal articles, Drees sets the tone by formally introducing Islamic applied ethics as a category within religion and science discourse. On the theoretical side, Ghaly reports on when human life begins, while Haider offers a framework for human-extraterrestrial interactions. Other philosophical considerations include investigating the role of epistemic frameworks (Qureshi), and the role of Islamic leadership paradigms (Rasheed). The remaining works directly apply principles of Islamic jurisprudence to inform bioethical questions on organ donation, epidemics, stem cell research, genetically modified foods, reproductive technologies, and animal neutering, (Aasi, Ahmad, Al-Hayani, Alghrani, Ghaly, Ishak, Munir, Saniei).

Books

Ghaly, M. (2022). *End-of-life Care, Dying and Death in the Islamic Moral Tradition*. Germany: Brill.

This volume examines how multifaceted End-of-Life-Care moral questions can be addressed from interdisciplinary perspectives within the Islamic tradition.

Padela, A. (2021). *Medicine and Shariah: A Dialogue in Islamic Bioethics*. University of Notre Dame Press.

This book brings together experts from various fields, including clinicians, Islamic studies experts, and Muslim theologians, to analyze the interaction of the doctors and jurists who are forging the field of Islamic bioethics.

Articles

Aasi, G., (2003) "Islamic Legal and Ethical Views On Organ Transplantation and Donation", *Zygon: Journal of Religion and Science* 38(3), 725–734. doi: https://doi.org/10.1111/1467-9744.00531

This article explores Islamic ethical and legal opinions on organ donation and transplantation.

Ahmad, Z., & Ahad, A. (2021). "COVID-19: A Study of Islamic and Scientific Perspectives", *Theology and Science, 19*(1), 32–41. 10.1080/14746700.2020.1825192

This work compares Islamic and scientific approaches to plagues like COVID-19.

Al-Hayani, F., (2008) "Muslim Perspectives on Stem Cell Research and Cloning", *Zygon: Journal of Religion and Science* 43(4), 783–795. doi: https://doi.org/10.1111/j.1467-9744.2008.00960.x

This works employs Islamic jurisprudence to investigate the ethics of embryonic stem cell research or cloning, concluding that it depends on the benefits derived.

Al-Hayani, F., (2007) "Biomedical Ethics: Muslim Perspectives on Genetic Modification", *Zygon: Journal of Religion and Science* 42(1), 153–162. doi: https://doi.org/10.1111/j.1467-9744.2006.00812.x

This work assesses the ethics of technology pertaining to genetically modified foods

Al-Hayani, F., (2005) "Islam and Science: Contradiction or Concordance", *Zygon: Journal of Religion and Science* 40(3), 565–576. doi: https://doi.org/10.1111/j.1467-9744.2005.00688.x

This work presents historical evidence to contextualize the role of ijtihād in Islamic law, and to advocate for ethical innovation.

Alghrani, A., (2013) "Womb Transplantation and The Interplay of Islam and The West", *Zygon: Journal of Religion and Science* 48(3), 618–634. doi: https://doi.org/10.1111/zygo.12037

This work examines the benefits of the first two successful uterus transplants (completed in Saudi Arabia and Turkey). It argues for Islamic scholars to evaluate the bioethics of uterus transplants for a more widespread adoption of this technology

Drees, W., (2013) "Islam and Bioethics in The Context Of "Religion and Science"", *Zygon: Journal of Religion and Science* 48(3), 732–744. doi: https://doi.org/10.1111/zygo.12022

This work introduces an applied ethic, particularly Islam and bioethics, within the framework of "religion and science" discourse in the journal *Zygon*.

Ghaly, M., (2013) "Collective Religio-Scientific Discussions on Islam and HIV/AIDS: I. Biomedical Scientists", *Zygon: Journal of Religion and Science* 48(3), 671–708. doi: https://doi.org/10.1111/zygo.12034

This study examines how collaboration between Muslim scholars and biomedical scientists lead to the development of collective legal reasoning (*ijtihād jamāʿī*) on ethical questions raised by the AIDS pandemic.

Ghaly, M., (2012) "The Beginning of Human Life: Islamic Bioethical Perspectives", *Zygon: Journal of Religion and Science* 47(1), 175–213. doi: https://doi.org/10.1111/j.1467-9744.2011.01245.x

This work analyzes the proceedings of a symposium held in 1985 on the question, "When does human life begin?" It argues that this event is a milestone in the field of Islamic bioethics and independent legal reasoning (*ijtihād*).

Haider, S., Ansar, A., & Naqvi, S.,Ali Asdaq. (2023). "Shīʿī Imāmī Thought on Existence, Life, and Extraterrestrials", *Theology and Science, 21*(2), 261–272. 10.1080/14746700.2023.2188372

This work employs Shīʿī philosophical and textual evidence to argue for the existence of extraterrestrial life and offer a framework for human-extraterrestrial interactions.

Ishak, M. & Haneef, S., (2014) "Reproductive Technology: A Critical Analysis of Theological Responses In Christianity And Islam", *Zygon: Journal of Religion and Science* 49(2), 396–413. doi: https://doi.org/10.1111/zygo.12097

This work goes beyond the question of legality to consider how Islamic and Christian paradigms inform the modern use of reproductive technology.

Munir, S. M.,Bin Ismail, & Mokhtar, M.,Istajib Bin. "How Does Islamic LawView Current Neutering Practices for Cats and Dogs?", *Theology*

and Science, 1–21. 10.1080/14746700.2024.2351646

This work attempts to find common ground between Islamic law and veterinary science on the topic of animal neutering, with concern for animal welfare and overpopulation.

Qureshi, O. & Padela, A., (2016) "When Must a Patient Seek Healthcare? Bringing The Perspectives of Islamic Jurists and Clinicians Into Dialogue", *Zygon: Journal of Religion and Science* 51(3), 592–625. doi: https://doi.org/10.1111/zygo.12273

This work focuses on the epistemic frameworks motivating the work of Muslim physicians and Islamic jurists when analyzing the moral dimensions of biomedicine. It offers a model to integrate the deliverables of medical science within the deliberations of Islamic jurists.

Rasheed, S. & Padela, A., (2013) "The Interplay Between Religious Leaders And Organ Donation Among Muslims", *Zygon: Journal of Religion and Science* 48(3), 635–654. doi: https://doi.org/10.1111/zygo.12040

This work argues for a new approach to health interventions by combining scientific theories of behavior change with two religious leadership paradigms found in the Islamic tradition.

Saniei, M., & Kargar, M. (2021). "Modern Assisted Reproductive Technologies and Bioethics in the Islamic Context", *Theology and Science, 19*(2), 146–154. 10.1080/14746700.2021.1910914

This work describes Islamic ethical opinions that permit or restrict the use of modern assisted reproductive technologies in an Islamic context.

4. Applied Islamic Hermeneutics (tafsīr, hadīth)

Two books address key issues in how to approach Qur'ānic interpretation: Altaie focuses on scientific signs in the Qur'ān, and Yazicioglu focuses on the issue of interpreting miracles. Taslaman' book and the journal articles primarily take on the task of applying Islamic hermeneutics to neo-Darwinian evolution. Scholars operate from both Sunnī theological models (Ali, Malik, Moran) and a variety of Shīʿī theological models (Andani, Inoles, Kocsenda, Paya). Some offer their independent engagement with scriptural exegesis (Ali, Batchelor), while others explore problems in Islamic hermeneutics, such as "juristic literalism" (Guessoum), problems with misinterpretation of historic texts (Malik 2019), and the incompatibility of Islam and evolution (Daneshgar). Finally, the overview on the Symposium on Islam and Evolution covers perspectives from philosophers, theologians, and scientists, including Safaruk Chowdhury, Karim Kocsenda, Khalil Andani, David Jalajel, and Shoaib Malik.

Books

Altaie, M. B. (2019). *The Divine Word and The Grand Design: Interpreting the Qur'an in the Light of Modern Science*. United Kingdom: Beacon Books

> Basil Altaie follows a new approach in discussing the scientific signs alluded to in the Qur'ān by subjecting its verses to the scrutiny of linguistic and scientific analysis. Altaie attempts to answer a pressing question confronting Muslims in the modern age: is it possible to adopt an 'Islamic' perspective in understanding the discoveries of natural sciences?

Taslaman, C. (2022). *Can a Muslim be an Evolutionist? In: Clark, K.J., Koperski, J. (eds) Abrahamic Reflections on Randomness and Providence*. Palgrave Macmillan. (HERM) https://doi.org/10.1007/978-3-030-75797-7_6

This chapter makes the argument that no claim about the emergence of life forms and humans can contradict Islam since the Qur'ān doesn't teach how God created species.

Yazicioglu, I. (2015). *Understanding the Quranic Miracle Stories in the Modern Age*. United States: Pennsylvania State University Press.

Isra Yazicioglu describes the fascinating medieval Muslim debate over miracles and connects its insights with early and late modern turning points in Western thought and with contemporary Qur'ānic interpretation.

Articles

Ali, M. (2023). "The Human Being as the Mystery of Kun Fa Kān: An Engagement with Shoaib Ahmed Malik's Islam and Evolution: Al-Ghazālī and the Modern Evolutionary Paradigm", *Theology and Science, 21*(4), 732–744. 10.1080/14746700.2023.2255954

This work engages with Shoaib Malik's book by using a plain sense reading of Islamic scripture. It singles out "human exceptionalism" as the optimum view on evolution.

Andani, K., (2022) "Evolving Creation: An Ismaili Muslim Interpretation of Evolution", *Zygon: Journal of Religion and Science* 57(2), 443–466. doi: https://doi.org/10.1111/zygo.12774

This work presents a Shīʿī Ismaili engagement with neo-Darwinian evolution. It argues that Ismailis can affirm evolution without exceptions due to contemporary and historical Ismaili thought.

Batchelor, D. A. (2017). "Adam and Eve's Origin: A Theory Harmonising Scientific Evidence with the Qur'anic Text", *Theology and Science, 15*(4), 490–508. 10.1080/14746700.2017.1369762

This work uses facts about the skeletal material of early *Homo sapiens* to offer a parsimonious theory of human origin that accommodates relevant Qur'ānic statements.

Daneshgar, M., (2020) "Uninterrupted Censored Darwin: From the Middle East to The Malay-Indonesian World", *Zygon: Journal of Religion and Science* 55(4), 1041–1057. doi: https://doi.org/10.1111/zygo.12644

This work traces the relationship between Darwinian evolution and Muslim thought since the twentieth century. It uses original literature from the Islamic world to display the uninterrupted challenge between Muslims and European evolutionary thought.

Guessoum, N., (2010) "Religious Literalism and Science-Related Issues in Contemporary Islam", *Zygon: Journal of Religion and Science* 45(4), 817–840. doi: https://doi.org/10.1111/j.1467-9744.2010.01135.x

This work evaluates the role of juristic literalism in religious discourse on science. It proposes an alternative using a *maqāsidi* (objectives-based) approach.

Inloes, A. (2023). Other "Adams": Twelver Shiʿism and Human Evolution. *Theology and Science, 21*(4), 708–731. 10.1080/14746700.2023.2255953

This work is written in dialogue with Shoaib Malik's *Islam and Evolution*. It synthesizes classical Twelver Shīʿī exegesis, hadith, doctrines, and philosophy with contemporary exegesis and scientific thought to defend human evolution.

Kocsenda, K., (2022) "Shīʿī Readings of Human Evolution: Ṭabāṭabāʾī To Ḥaydarī", *Zygon: Journal of Religion and Science* 57(2), 418–442. doi: https://doi.org/10.1111/zygo.12781

This work features Shīʿī thinker Kamal al-Haydari, who developed his views from Tabatabaʿī, author of a seminal exegesis of the Qur'an. It examines Haydari's views on evolution, his creationist conclusion, and his novel theological reading of evolution.

Malik, S. A. (2023a). Defending 'Islam and Evolution: Al-Ghazālī and the Modern Evolutionary Paradigm': Abrahamic Dialogues and Interdisciplinary Insights. *Theology and Science, 21*(4), 745–780. 10.1080/14746700.2023.2255955

This work responds to interlocuters and addresses their arguments in terms of methodological issues, scientific issues, metaphysical issues, and hermeneutic issues.

Malik, S., (2022) "Introduction to The Symposium on Islam And Evolution", *Zygon: Journal of Religion and Science* 57(2), 389–392. doi: https://doi.org/10.1111/zygo.12779

Petersen, A., (2022) "ISLAM AND EVOLUTION", *Zygon: Journal of Religion and Science* 57(2), 297–298. doi: https://doi.org/10.1111/zygo.12799

These two works provide an overview of the Symposium on Islam and Evolution. They include perspectives from scientists, theologians, and philosophers, from both Shīʿī and Sunnī perspectives, including from: Safaruk Chowdhury, Karim Kocsenda, Khalil Andani, David Jalajel, and Shoaib Malik.

Malik, S. & Kulieva, E., (2020) "Does Belief in Human Evolution Entail *Kufr* (Disbelief)? Evaluating The Concerns of A Muslim Theologian", *Zygon: Journal of Religion and Science* 55(3), 638–662. doi: https://doi.org/10.1111/zygo.12620

This work critically evaluates the position of contemporary Muslim theologian, Nuh Keller on the compatibility of evolution and Islam. It argues that his claim of irreconcilability between evolution and the

creationist narrative in Islamic scripture is unwarranted and does not necessarily or definitively entail *kufr* (disbelief).

Malik, S., (2019) "Old Texts, New Masks: A Critical Review of Misreading Evolution Onto Historical Islamic Texts", *Zygon: Journal of Religion and Science* 54(2), 501–522. doi: https://doi.org/10.1111/zygo.12519

This work examines historical Islamic texts that seem to suggest that humans evolved from lower forms of species. It argues that these are mistaken interpretations by contemporary readers and do not actually represent evolution as understood today.

Moran, G., (2021) "The Final Domino: Yasir Qadhi, Youtube, And Evolution", *Zygon: Journal of Religion and Science* 56(1), 34–53. doi: https://doi.org/10.1111/zygo.12666

This work examines the role of Muslim clerics and public figures in shaping the religion and science discourse. It focuses on the nuanced position of Dr. Yasir Qadhi on the compatibility between Islam and evolution.

Paya, A. (2022). "Science vs. Religion: The Case of a Historical Intellectual Exchange between Two Shi'i Scholars Regarding Evolution", *Theology and Science, 20*(3), 328–342. 10.1080/14746700.2022.2084855

This work explores the impact of the exchange between Dr. Yadollah Sahabi and a prominent Shīʿī theologian on the relationship between science and theology in Iran.

5. *Applied Islamic Philosophy and Theology (kalām, aqīda)*

The section on applied philosophy includes original engagement with works on epistemology, cosmology, ontology, and theology. Some books focus on the application of theology to particular issues, such as evolution (Jalajel, Malik), biomedicine (al-Akifi), and extraterrestrial life (Malik 2024), while others take a wider approach, suggesting models of divine action and cosmology (Guessoum, Chittick) and revitalizing the role of design arguments (Malik and Kojonen 2024). For journal articles, several authors engage with al-Ghazālī's work on causation (Bargeron, Rayan) and in its application to human evolution (Malik). Their epistemological concern develops into the broader question of scientific realism and anti-realism, and divine action (Jalajel, Khan). Several authors respond to works by modern Islamic philosophers and theologians, such as Iqbal's divine action model (Siler) and Naquib al-Attas' critique of modern science (Harvey). Finally, a historical approach is used to identify the relationship between the Islamic occult sciences and the West (Melvin-Koushki).

Books

al-Akifi, A. and Padela, A. (2022). *Islam and Biomedicine*. Switzerland: Springer International Publishing.

This book considers how Islamic theological constructs align with the science and practice of medicine, and in so doing offer resources for bridging the challenges of competing ontological visions, varied epistemic frameworks, and different theologies of life and living among the bodies of knowledge.

Chittick, W. C. (2007). *Science of the Cosmos, Science of the Soul: The Pertinence of Islamic Cosmology in the Modern World*. United Kingdom: Oneworld Publications.

Islamic Intellectualism is dead: or so argues William Chittick in this radical new book challenging modern trends in religious thought. Chittick argues that it is essential to return to the ways of the ancient Sufis, who viewed knowledge of the soul, the world, and God as an extension of the same thing.

Guessoum, N. (2010). *Islam's Quantum Question: Reconciling Muslim Tradition and Modern Science*. United Kingdom: Bloomsbury Publishing.

In its application of a specifically Muslim perspective to important topics like cosmology, divine action and evolution, the book makes a vital contribution to debate in the disputed field of 'science and religion'.

Jalajel, D. S. (2009). *Islam and Biological Evolution: Exploring Classical Sources and Methodologies*. South Africa: University of the Western Cape.

Is Islam neutral towards the idea of biological evolution? Does it support it or categorically reject it? These questions are explored within the framework of classical Islamic scholarship by bringing an accurate, up-to-date understanding of Evolutionary Biology to a systematic consideration of the traditional Islamic sciences.

Malik, S.A. (2024). *Islamic Theology and Extraterrestrial Life: New Frontiers in Science and Religion*. United Kingdom: Bloomsbury Publishing. (theology)

Over the last thirty years, humanity has discovered thousands of planets outside of our solar system. The discovery of extraterrestrial life could be imminent. This book explains how such a discovery might impact Islamic theology.

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Articles

Bargeron, C. L. (2007). "Re-thinking necessity (al-Darūra) in al-Ghazālī's understanding of physical causation", Theology and Science, 5(1), 21–36. 10.1080/14746700601159390

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Harvey, R. (2023). "Islamic Theology and the Crisis of Contemporary Science: Naquib al-Attas' 'Metaphysical Critique' and a Husserlian Alternative", *Theology and Science, 21*(3), 404–420. 10.1080/14746700.2023.2 230429

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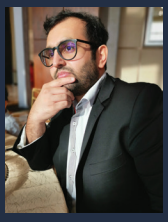
This work examines how Iqbal's conception of divine action can offer a theistic worldview, while retaining the pragmatic benefits of David Armstrong's Laws of Nature.

This essay overviews the evolving field of Islam and Science by mapping out the key discussions, highlighting major contributors, and offering insights into how Islamic thought has historically engaged with science, as well as its interaction with modern developments. It is divided into two parts: 1) exploring the field's historical development and 2) examining its current state. Before diving into these topics, however, it was important to outline a few key considerations that have guided this exploration.



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