University of
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St Andrews Encyclopaedia of Theology

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First published: 1 August 2024

https://www.saet.ac.uk/Christianity/ScienceEngagedTheology

Citation

Leidenhag, Joanna. 2024. 'Science-Engaged Theology', *St Andrews Encyclopaedia of Theology*. Edited by Brendan N. Wolfe et al. https://www.saet.ac.uk/Christianity/ScienceEngagedTheology Accessed: 7 August 2024

Copyright information

ISSN 2753-3492

Science-Engaged Theology

Joanna Leidenhag

Over the last seventy years, the field of science-and-religion has become an interdisciplinary area of study, concerned with the relationship between the natural and psychological sciences and religious faith. Within science-and-religion, scientific and theological research have sometimes been viewed as opposing or competing routes to knowledge. More frequently, science and theology have been viewed as compatible, but entirely separate, enterprises. Science-engaged theology rejects both of these options and suggests a third way. Science-engaged theology affirms the idea that the study of God (theology) must include the study of God's creation, as conducted by the natural and human sciences. In this way, science-engaged theology is one scholarly response to the biblical incitement to 'ask the beasts, and they shall teach you' (Job 12:7–10), or the Psalmist's testimony that 'the heavens declare the glory of God' (Ps 19:1).

Unlike science-and-religion, science-engaged theology does not seek to become institutionalized into a new area of study or special interest group. Nor does science-engaged theology claim to be a school of thought localized to the pre-existing community of science-and-religion scholars. Instead, science-engaged theology encourages all theologians, across the many traditions and institutional communities of theology, to use scientific research to aid their work when appropriate. Although science-engaged theology applies to any faith and wisdom tradition, this entry focuses on Christianity (for a discussion of science-engaged theology in Judaism, see Samuelson 2023).

Section one outlines the definitions and intellectual contexts of science-engaged theology. Section two provides examples of science-engaged theology in relationship to the life of a believer. The longest section, section three, outlines five objections to science-engaged theology and offers possible responses to these objections. This results, in section four, with a recommendation for two avenues for future development. The conclusion highlights the main points readers should take away from each section.

Keywords: Science, Christian theology, Methodology, Knowledge, Research, Belief, Theology and science

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1 The definitions and intellectual contexts of science-engaged theology

Science-engaged theology can be loosely (and almost tautologically) defined as theology which engages the work of natural and human scientists. Over the last seven years, in part due to generous funding from the John Templeton Foundation, hundreds of theologians have undertaken training to more explicitly and consciously engage with scientific literature and methods. While most of this work has proceeded without anxious handwringing about the term 'science-engaged theology', two projects at the University of St Andrews led by John Perry have attempted to give a clear definition and apologetic for science-engaged theology. As a result, section 1.1 relies somewhat heavily on the work of Perry, and his co-authors Sarah Lane Ritchie, Kevin Nordby, and Joanna Leidenhag. Funding incentives aside, section 1.2 accounts for the apparently sudden appearance and success of science-engaged theology by placing it within its larger intellectual context. This is done by summarizing three different stories that various scholars have told to position science-engaged theology as the result of wider trends within science-and-religion, modern theology, and contemporary universities (for more on past interaction between the two disciplines, see The History of Science and Theology).

1.1 Definitions: Swiss Army knife, puzzles, sources, mindset, and community

This section surveys the five main metaphors that Perry, Ritchie, and Leidenhag have used to try to give a clear definition to science-engaged theology. Although there is consistency between these metaphors, and they should not be seen as mutually exclusive, there is also a perceivable evolution in the meaning of science-engaged theology over time (see Harris 2024a: 16–22). The section concludes by suggesting how these five metaphors may fit together, and how each one can be viewed as emphasizing a different feature of science-engaged theology.

The earliest-published definition of science-engaged theology was in an article by John Perry and Sarah Lane Ritchie (2018). They present science-engaged theology through 'an analogy with the Swiss Army Knife. Call it Swiss Army Knowledge', because, 'like the famous knives, seeking knowledge involves a collection of different, well-defined tools' (Perry and Ritchie 2018: 1087). They argue that it is important to realise that not only do different questions require different 'tools' to answer well, but also that 'there are all sorts of questions that cannot be adequately answered *except* by using multiple tools. Swiss Army Knowledge enables us to see that the tools are different, but inseparable, at least for complex tasks' (Perry and Ritchie 2018: 1087, original emphasis).

Perry and Ritchie then provide a list of such tasks, which boil down to asking far more specific questions than has commonly been the case in the field of science-and-religion. They write:

> We should not ask, 'What do science and religion say about, for example, evolution?' because it is a hopeless question, thus formed. But, 'What can neuroscience of addictions and the Eastern Orthodoxy liturgy teach us about moral habit formation?' – that would be an excellent, and answerable, topic. (Perry and Ritchie 2018: 1086)

After offering more examples, they conclude:

> These are not the sort of questions that can be addressed in the abstract with vague references to science, religion, or naturalism, but topics at the intersection of the specific subdisciplines of agroecology and natural law, addiction research and theological ethics, neurobiology and Aristotelian-Thomistic theologies of habit. (Perry and Ritchie 2018: 1088)

Perry and Leidenhag refer to these more specific questions as 'theological puzzles' (Perry and Leidenhag 2021b: 247). The idea of 'solving theological puzzles' is the second metaphor for defining science-engaged theology (Silva and Recio 2023: 1). In the large online open-access collection of science-engaged theology essays (or puzzles), Perry (and his co-author Kevin Nordby) give a more detailed definition of what a theological puzzle is meant to be:

> [A] theological puzzle is a theological question that heads towards a concrete answer, deals with possible objections, is transparent about using a methodology appropriate to its success conditions, and in principle is unsolvable without the help of, at least some, empirical data. (University of St Andrews 2024a)

Parts of this definition are not unique to science-engaged theology, or theological puzzles. It is good academic practice, regardless of the topic one is dealing with, to consider possible objections and be transparent in one's methodology. However, not all theological questions need to aim towards a concrete answer that requires empirical data. It seems then that what makes science-engaged theology distinct from other forms of theological enquiry is not just its method in answering questions but the kinds of questions that it seeks to ask.

Perry and Leidenhag (2021b; 2023) introduce a third metaphor with which they define science-engaged theology: Science-engaged theology uses science as a source for theological reflection. They write:

> we think that the natural sciences are better conceived of as a *source* for theology alongside Scripture, tradition, reason and experience. Indeed, the natural sciences might be thought of within the source of experience, albeit a type of experience that is interpreted (like Scripture), constrained by a standardized method of public enquiry (like reason), and subject to falsification and amendment (as a kind of tradition). (Perry and Leidenhag 2021b: 248, original emphasis)

Later, Perry and Leidenhag would retract the claim that the natural sciences are more closely associated with experience than the other sources, by arguing that the 'very idea of counting sources only leads to placing them in competition and debating which level of revelation can be reduced to another' (2023: 50). This, they argue, is 'characteristically modern and deeply mistaken. Theological sources are not discrete pots of information' (Perry and Leidenhag 2023: 50). Following Perry and Leidenhag, Simon Maria Kopf offers the following definition of science-engaged theology: 'Theology is science-engaged if and only if science is, and is used as, a source of theological knowledge' (2024: 3).

In analysing the evolution of meaning across these definitional metaphors, Mark Harris notes that Perry and Leidenhag have removed even the possibility of science and religion being seen as competing worldviews, 'since the sciences are now treated as a source of theological truth'. (Harris 2024a: 18). Whereas Perry and Ritchie (2018: 1085) referred to scripture, tradition, reason, and experience as a theologian's 'tools' (or 'principles of verification'), which differ from those used by scientists, Perry and Leidenhag count the tools of science to be among theology's sources, rather than separate from them. It seems that, for Perry and Ritchie (2018), science and theology sit side-by-side as commensurable knowledge-seeking enterprises, whereas for Perry and Leidenhag (2021b; 2023) theology provides the larger context within which empirical investigations are conducted.

Perry and Leidenhag's monograph (2023) draws the language of 'tools' and 'sources' together, but also introduces a fourth set of metaphors. Science-engaged theology is now also referred to as a 'mindset', 'mental attitude', 'disposition', and 'reminder' (Leidenhag 2023a: 1–2, 7). They open their book with the statement: 'science-engaged theology aims to serve as a reminder to theologians that the local tools and products of the sciences ought to be sources for theological reasoning' (Leidenhag 2023a: 1). Harris (2024a: 22) notes that, although all these definitions are 'roughly consistent', there is a shift from seeing science-engaged theology as being like objective tools and sources towards defining science-engaged theology more subjectively as a 'mental attitude'. Harris concludes that this suggests a move 'away from any sense in which science-engaged theology might entail firm methodological principles' (Harris 2024a: 22). Although Harris

is right to point out that the metaphors have shifted from external objects to subjective attitudes, it is not clear that the earlier articulations of science-engaged theology included firm methodological principles.

Harris then offers his own fifth metaphor. He suggests that the objective to subjective trajectory terminates in 'a construal of SET [science-engaged theology] *as a discipline*, by which I mean a community of like-minded scholars' (Harris 2024a: 22, original emphasis). Harris' suggestion – that a group of scholars who share the same intellectual disposition in how they pursue their subject matter is really a discipline – presents a powerful challenge to science-engaged theology. After all, science-engaged theology does not seek to become a distinct field of research for a small group of interested scholars. As Leidenhag writes: 'it would be possible (but not desirable) for SET to become an intellectual tradition' (2023b: 6). She argues that, instead, science-engaged theology 'is more helpful to theology […] as an intellectual disposition that all theologians share and take into whatever conversations they are already engaged in' (Leidenhag 2023b: 6). Echoing Perry and Ritchie's 2018 article, Leidenhag concludes that science-engaged theology is simply 'a disposition […] to make sure one is using the right tools for the job' (Leidenhag 2023b: 7). One wonders if this definition is so broad as to be trivial.

Science-engaged theology can be simply (but almost tautologically) defined as theology which engages the work of natural and human scientists. The five metaphors surveyed above, which Perry, Ritchie, Nordby, Leidenhag, and Harris have used to give further definition to science-engaged theology, are not mutually exclusive. This section concludes with an analysis of how each metaphor highlights an important aspect of science-engaged theology's evolving identity.

The first metaphor, that science-engaged theology is like a Swiss Army Knife, emphasizes the interdisciplinary and pragmatic nature of science-engaged theology. Since a Swiss Army Knife is a single unified device with many different tools or functions, this metaphor also indicates something of how science-engaged theology is seeking to overcome the intellectual segregation and sharp division of labour between the sciences and theology (or, indeed, between the sciences and the humanities more widely), which has been largely assumed in the field of science-and-religion.

The second metaphor, that science-engaged theology answers puzzles, stresses that such interdisciplinarity is best practiced when asking highly-localized questions that require specialized methods from different disciplines to answer. The metaphor of the puzzle and the metaphor of the Swiss Army Knife fit together, then, as a complementary question-and-answer.

The third metaphor, that science-engaged theology sees the sciences as being among the sources of theology, emphasizes that even if the methods for answering

puzzles are interdisciplinary, the question being asked should be ‘thoroughgoingly theological’ (University of St Andrews 2024c). The idea of scientific methods and theories as sources to be used for theology’s ends gives logical priority to theology. If science-engaged theology is a unified interdisciplinary tool (like a Swiss Army knife), it is a tool wielded by theologians.

The fourth metaphor (a mindset) and the fifth metaphor (a community) fit together insofar as what unifies academic sub-communities are shared dispositions about what methods and questions are worth pursuing. However, these two metaphors also stand in some tension regarding the balance of scope and intensity: should science-engaged theology be a disposition all theologians bring to some theological topics, or should science-engaged theology be an approach some theologians dedicate themselves to cultivating across numerous topics? The former seems to fit Perry and Leidenhag’s theoretical idea of science-engaged theology, the latter is significantly more practical. Again, one need not side with just one answer to this question – science-engaged theology could have both dedicated experts and more general practitioners.

1.2 Intellectual contexts: science-and-religion, modern theology, and research universities

Science-engaged theology did not appear out of nowhere, but is part of and a response to ongoing transformations in the localized field of science-and-religion, the long history of modern theology, and university culture more broadly. Those seeking to explain where science-engaged theology comes from have typically narrated one of three stories, such that science-engaged theology is positioned as the natural conclusion these trajectories of intellectual change. There is a local story, a long story, and a broad story.

The local story presents science-engaged theology’s immediate intellectual context by focusing on changes and developments within the field of science-and-religion in Western academia over the last eighty years. Andrew Davison lays this out in three acts. Act one concerns the origin of science-and-religion in the 1960s and 1970s, when

> questions of methodology loomed large in the world of Ian Barbour (with later elaborations by John Polkinghorne and Arthur Peacocke), not least in typologies of possible relations between science-and-religion. (Davison 2022a: 21; cf. Perry and Leidenhag 2023: 13–16)

During the second act, from the 1980s to the early 2000s, there is ‘a welcome shift of focus to the study of particular questions’, combined with a ‘responsive and revisionist’, theological posture ‘ungrounded in any historical theological writing’ (Davison 2022a: 22–23). Davison’s representative example of this phase is the so-called ‘Divine Action Project’ (1988–2003). At the same time (still the second act), new work complexifying the

history of science-and-religion appeared from historians such as John Hedley Brooke, Ronald Numbers, David Livingstone, and Peter Harrison. As outlined in Perry and Leidenhag, this work not only dismantles myths of conflict and independence, but 'drives more nails in the coffin' of methodologies and typologies because it is no longer clear what we are referring to by 'science' and 'religion' when we ask questions like: 'how do science and religion relate?' (2023: 16–21). For Perry and Leidenhag, this historical (and historiographical) work 'shows why a different approach to the whole idea of science and religion is needed' (2023: 16).

Davison's third act involves a question: if we accept that the field of science-and-religion needs a different approach, what form should this approach take? Science-engaged theology is cast by Perry and Leidenhag (2021b: 247) as one possible answer to this question. They argue that since 'science' and 'religion' 'are not natural kinds or transhistorical categories, but socially contingent groupings of diverse and intertwined knowledge-seeking enterprises', and the only way forward for theologians to engage the sciences is 'to stay local and specific' (Leidenhag 2023b: 7, 36). In Davison's conception, science-engaged theology is the part of the third act that prescribes more science as the solution. Davison writes,

> Since the sciences are intrinsically about the specificities of things, it seems fair therefore to say that a shift in attention towards more specific scientific interests among theologians makes their work intrinsically more scientific. (Davison 2022a: 26)

This observation seems correct and also explains why, as seen in section 3.2, science-engaged theology has attracted some critiques of implicit scientism.

The long story relates science-engaged theology to changes in authoritative status of theology over the course of Western intellectual history. To introduce this long story, it is worth mentioning the other main response (thus far) to the question of where to go after the historiographical revolution. This second response, championed by Peter Harrison, Paul Tyson, and John Milbank (Harrison and Tyson 2022; Harrison and Milbank 2022; Tyson 2022), is a call not just for more history, but for a 'retrieval' or '*ressourcement*' of theology's own historical and philosophical resources in order to 'call into question an entire existing intellectual discourse and to try and forge a new one in its place' (Milbank 2022: 75). The approach of Harrison, Tyson, and Milbank (among others), shares in (and narrates) the second intellectual context of science-engaged theology. However, their response is not identical to science-engaged theology but is best seen as a theology of science (see section 4.1).

Perry and Leidenhag (2023: 27) argue that science-engaged theology is one result of the longer story, which they refer to as ‘theology’s new boldness’ (Tanner 2010: 39). This boldness refers to a recovery of confidence from the false choices of either relativism or sectarianism that theology faced under the conditions of modernity. This recovery allows theologians to both offer theological correctives to faulty scientific pictures of the world and to receive correction from scientists when they inaccurately describe God’s creation.

Across different sections of their, book Perry and Leidenhag tell this long story rather loosely. For clarity, it is summarized here as if it were divided into five chronologically-ordered phases (which it is not in Leidenhag 2023a). Phase one in Perry’s and Leidenhag’s long story, opens with the demise of theology’s authoritative status in the philosophies of Descartes, Hume, Kant, Mill, and Locke (2023: 21–25). In the second phase, nineteenth-century figures such as Thomas Jefferson, John William Draper, and Andrew Dickerson White politicized the terms ‘science’ and ‘religion’ by using them as cyphers for rational emancipation and superstitious enslavement (Perry and Leidenhag 2023: 9–11, 21–25). This culminates for Perry and Leidenhag in the third phase, with various attempts in the twentieth century to present the sciences as a single unifying basis for a global, liberal, secular order (2023: 36–39). Phase four contains the decisive shift from a story of theology’s demise to one of theology’s recovery of confidence. Karl Barth is presented as the pivot and his influence runs through the Yale School of post-liberal theology, Radical Orthodoxy, and John Webster’s work (Perry and Leidenhag 2023: 25–36). Finally, in what can be thought of as the fifth phase, the recovery of theology is aided by changes in philosophy of science from Thomas Kuhn and Mary Hesse to the Stanford School and contemporary feminist philosophy of science (Perry and Leidenhag 2023: 39–46).

It is worth noting that the historical theologies of science in Harrison and Milbank (2022) have a different (older) set of heroes, including Origen of Alexandria, Robert Grosseteste, Thomas Aquinas, Nicholas of Cusa, Herbert of Cherbury, and others. Likewise, a slightly different story to the one told by Perry and Leidenhag is told by Dirk Evers, which focuses on the German context (Forthcoming). In all of these different versions of the long story, the basic shape of the narrative (e.g. that of theology’s demise and recovery) remains the same. Furthermore, these long narratives of theology’s renewed confidence flow into the local story of science-engaged theology’s relationship to science-and-religion by contributing to what Harris refers to as ‘the theological turn’ in the science-and-religion field (Harris 2024a: 15). As such, Davison expects that future work in science-engaged theology will not only contain more specific science but will also be ‘more specifically Barthian, Thomist, Bonaventurian, Nyssan, and so on’ (Davison 2022a: 27). For example, see the development of ‘Science-engaged Thomism’ (Kopf 2024; Silva and Recio 2023).

Finally, the broad story provides insights into the intellectual context of science-engaged theology from across the university, including disciplines that initially appear unrelated to the work of either scientists or theologians. This broad context is gestured at by Davison when he mentions 'the general turn to inter-disciplinarity in the university' (Davison 2022a: 25) and the shift in science-and-religion more widely away from a bilateral towards 'a multilateral conversation' (Davison 2022a: 27). In the case of science-engaged theology, the multilateral conversation seems to include broad academic movements (e.g. postmodernism, postcolonialism, feminism, and critical theory) as well as hot-button political debates of the day (e.g. Brexit and police funding). The influence of this broader intellectual context is not a story that Perry and Leidenhag tell explicitly. However, it is no coincidence that the anti-essentialism and dismantling of the metanarratives of 'science' and 'religion' by historians (which, as described above as the local story, was the immediate catalyst for science-engaged theology) coincided with broader postmodern disavowals of metanarratives and essentialist metaphysics. In Perry and Leidenhag's (2023) depiction of science-engaged theology, this broader intellectual context makes itself felt in their use of anti-imperial metaphors, their depiction of universities as a 'trading zone' akin to the European Union, their use of critical race theory, and their challenges to gender binarism in their chosen examples of science-engaged theology (see Perry and Leidenhag 2023: 21–25, 31, 34, 44, 46, 55, 58–62).

This broader intellectual context also has an institutional dimension. Over the last century, academia has grown astronomically in scale and diversity (number of people, institutions, sub-disciplines, research methods, etc.), leading to an ever-more complex professionalization of academia as a major global industry of education and research. Science-engaged theology takes this deepening specialization to mean that the range of topics that any one researcher can claim to be expert in gets smaller and smaller. In contrast to those who advocate for a return to the idea of the sciences as (a theologically-ordered) 'natural philosophy' (Harrison, Tyson, Milbank, et al.), this deepening specialization likely means that such an expansive label as 'natural philosophy' is unfit for the purpose of dividing up the tasks and resources and designing formative programmes of education to train the next generation of experts.

Science-engaged theology can be understood as a response to three intellectual changes of varying scales. At the smallest scale ('the local story'), science-engaged theology is a response to the growing anti-essentialism in the field of science-and-religion and the desire for more concrete, and specific, use of scientific studies within this field. This story pairs well with the idea that science-engaged theology is about solving theological 'puzzles' (see section 1.1). When construed in longer historical terms, advocates of science-engaged theology see it as part of theology's recovery from the challenges of modernity, which sought to make theologians play by non-theological (secular) rules. This

longer intellectual story fits particularly well with Perry and Leidenhag's (2023) prioritization of theology in their use of the 'source' metaphor (see section 1.1). This long story also helps to make sense of the desire for more specific and historically-nuanced theology within science-and-religion. Finally, the broad story concerns the wider shifts in academia (particularly within contemporary research universities) that mean that collaboration between traditionally siloed disciplines is both possible and encouraged in order to meet big contemporary political challenges. This final story finds resonance with the 'Swiss Army knife' metaphor for science-engaged theology (see section 1.1).

2 Examples of science-engaged theology in the life of the believer

How does science-engaged theology relate to the life of the believer? The best way to answer this question is not by describing science-engaged theology in theory, as the rest of this entry does, but by giving some concrete examples of science-engaged theological projects (or 'puzzles'). Some worthy science-engaged theologies are not directly applicable to the life of the believer, such as projects which use contemporary scientific research to 'illuminate historical thinkers and texts' (Boulding 2024: 100) or to inform a debate between academics (e.g. Massmann 2021). However, because science-engaged theology involves the use of empirical studies within theology, it does tend for the most part towards more practical and applied topics that impact the lives of everyday believers. As David Worsley writes, 'science-engaged work is particularly relevant for the study of Christian spiritual practices' and for studying 'how a person might come to know God' (2023: n.p., original emphasis). The examples of science-engaged theology surveyed in this section are divided into three categories of practical importance to believers: church polity, discipleship, and apologetics.

Some of the earliest examples of science-engaged puzzles relate to Roman Catholic Church polity. Perry's idea was that, in order to answer questions such as: 'can gluten-free bread be consecrated for the Eucharist?' or 'can intersex persons be ordained as Catholic priests?', one needs as accurate as possible an understanding of the relevant physical phenomena, namely the $C_{24}H_{27}N_5O_9$ protein and the various biological sex markers in humans and other mammals, respectively (see Perry 2021). Such examples may appear parochial, but the answers are of great importance to coeliac or intersex Christians.

In recent years, ecclesiastical responses to sex transitions, transgenderism, and non-heterosexual relationships have dominated debates in the Western church. Myron Penner, April Cordero, and Amanda Nichols (2023) and Megan Loumagne Ulishney (2022) have argued respectively that these debates need to be informed by the contingent variability of sexual development and sexual behaviour in evolutionary biology. These hot-button issues are not the only decisions religious institutions make which would benefit from

being informed by detailed knowledge of the physical and psychological phenomena. For example, in determining how long sermons should be or what language to use in multilingual contexts, preachers and elders would benefit from letting their decision-making be at least partially informed by evidence-based predictions on the impact these choices make on their congregations. When seeking to provide safe and inclusive spaces for disabled or neurodiverse people, pastors will benefit from a detailed understanding of their congregants' physical and cognitive profiles. In short, science-engaged theology is one way that churches can follow the wider cultural trend towards evidence-based policies.

As well as informing church polity and policies, many science-engaged theologies relate directly to various aspects of Christian discipleship – thereby informing how Christians practice and grow in their faith. For example, this might include psychological insights into how communal worship teaches participants to give God their attention, remember past events, and use gestures in worship (Cockayne and Salter 2021a; 2021b; King 2022; Arnold 2022). Such understanding can empower ordinary believers to engage more deliberately in such practices as they worship. However, discipleship also concerns daily life outside of Sunday worship services. Brittany Tausen and Katherine Douglas (2021) use social psychology to test the most effective methods for spiritual formation regarding learning to love our neighbours – specifically neighbours who are experiencing homelessness – which can be used to inform spiritual formation programmes as well as Christian ministries to the homeless. Timothy J. Pawl (2023) finds that, despite apparent surface tensions, the psychology of habit-formation is deeply harmonious with the Christian Moral Wisdom tradition and can therefore be used as a resource for encouraging sanctification. Growth in faith can sometimes entail standing in opposition to certain practices as a conscientious objector, but how do believers know when such (non-)action is warranted? Christina Lamb (2022) and Matthew Braddock (2022) use moral psychology in collaboration with Catholic moral theology to ask if and when such acts of conscience are reliable or objective. Finally, Christian discipleship centrally involves reading Christian scriptures. Several scholars have used scientific knowledge to bring insight or clarity to biblical passages which otherwise can appear ambiguous or opaque (see Butakov 2022; Chambers 2022; Kroll 2021; Zahl 2021). Such work can benefit ordinary believers in their own reading of the bible and inform preachers as they prepare sermons explicating these texts.

Science-engaged theology can help the faith of the believer by providing responses to various challenges encountered during the life of faith. In a time of growing awareness of the challenges that trauma brings to maintaining one's faith, the work of Sarah Lane Ritchie (2021) and Preston Hill and Dan Sartor (2022) is particularly salient. These scholars use cognitive science, neurobiology, and trauma studies to provide solutions for how to respond to the felt absence of or alienation from God's presence. Many believers undergoing times of ill health can feel torn between seeking help from their

religious community or from a medical professional. In work that helpfully overcomes this false dichotomy, Tasia Scrutton (2021a; 2021b), Kate Finley (2023), and Gillian Straine (2022) each examine how mental and physical healthcare might benefit from spiritual and psychological explanations and meaning-making therapies. Likewise, Tim Baylor (2022) looks at how cognitive science of emotion can help us understand the relationship between faith and despair. As such, believers need not feel like spiritual 'failures' when experiencing feelings of despair, and Baylor offers some concrete solutions to aid believers in these circumstances.

Science-engaged theology employs scientific findings to inform ongoing debates in Christian apologetics. Some such debates first arose because of initial scientific findings, which need to be continually updated. For example, debates about the reality of free will need revision in light of some neuroscientific findings (see Visula 2021; Kittle 2022) or the role of purpose in evolutionary biology (Leidenhag 2021). Other debates are more perennial, such as the problem of evil, which some scientific theories and discoveries seemingly intensify (see Qureshi-Hurst 2022; Campbell 2023). In this way, science-engaged theology can also be viewed as contributing to how Christians can 'always be prepared to give an answer' or defence of their faith (1 Pet 3:15–16).

In conclusion, science-engaged theology impacts the lives of ordinary believers in a number of different ways and in regard to a wide variety of topics. As Leidenhag aptly summarizes,

> there is not just one way for theologians to engage other disciplines. Sometimes these disciplines are used to help theologians find practical solutions to challenges facing the church; sometimes these disciplines inspire theologians to extend, fill-out, or correct a specific doctrine; and at other times these disciplines present theology with new challenges that need to be responded to. (Leidenhag 2023a: 2–3)

One of the most unique and exciting aspects of science-engaged theology is the practical applicability to ordinary believers that arises not from shallow or simple platitudes but from increased specificity.

3 Objections to science-engaged theology

Science-engaged theology has not been without opposition. This section gathers various objections against science-engaged theology and presents them as five key questions (see each of the sub-headings in this section). The first two of these objections have not been published against science-engaged theology, but are often raised as objections in public academic settings. The latter three objections are drawn from various publications. Consideration of these objections not only gives further clarity to what science-engaged

theology is (and is not), but also helps readers decide if they want to endorse and participate in science-engaged theology. For each objection, the main worries will be outlined, the accuracy and seriousness of each concern evaluated, and advice given to science-engaged theologians about what they might do to respond to this challenge.

3.1 Is science-engaged theology needed?

The first objection against science-engaged theology has not yet appeared in a scholarly publication, but is frequently raised in public settings. It is expressed in the sceptical question: is there a need for science-engaged theology? This question can be interpreted in two different ways. First, the question might be interpreted as asking if there is a need for theologians to engage the sciences. Second, the question could query whether there is a need for the label 'science-engaged theology' to exist. Each of these interpretations will be considered in turn.

The answer to the question of whether theologians need to engage the sciences depends on three judgements: (1) what the theological task is thought to be; (2) whether the collection of practices that the twenty-first century English-speaking world refers to as 'the sciences' is well-suited to help in this task; and (3) ultimately, what the scope and nature of God's revelation is believed to be.

One affirmative answer to the question, 'is there a need for science-engaged theology?', is that theology needs to engage with developmental psychology, evolutionary and genetic biology, biochemistry, astrophysics, neuroscience, and many others such disciplines, because 'theology needs the help of other disciplines to speak truly of God and all things in relation to God' (Perry and Leidenhag 2023: 36; cf. Davison 2022a: 19). Not everyone agrees that speaking truly of God and all things in relation to God is the best way to conceive of the theological task. Indeed, what the theological task is may change depending on one's context, audience, and positionality. Theology has many tasks, such as apologetics, declaration, worship, confession, discernment, arbitration, liberation, judgement/conviction, catechism, or providing practical guidance. The empirical sciences may be helpful to some of these tasks more than others, and Perry and Leidenhag admit that 'not all theology need be science-engaged […] However, sometimes it does' (2023: 54).

In considering the second judgement, it is worth noting that, although science-engaged theology places an explicit stress on 'the sciences', Perry and Leidenhag presuppose that theologians already engage the methods, concepts, and theories of other disciplines, such as history, philosophy, languages, sociology, literature, and the arts (2023: 1). As such, the question can be reframed to reverse the burden of proof: why shouldn't theologians engage the sciences, in addition to the many other disciplines already commonly employed by theologians? Before hastily capitulating to this rhetorical move,

it is worth pausing to consider that there may well be different theological rationale for engagement with different disciplines. For example, history has long been a priority in Christian theology because God is believed to have acted in uniquely revelatory ways within Jewish history. In Christianity, the question of which methods theologians should use is tightly bound up with the question of God's revelation. If historical methods are acceptable because God has revealed Godself in history, then it follows that natural and human scientific methods will be acceptable if (and possibly only if) God's revelation is believed to be found in the natural world, including in human psychology, physiology, and behaviour. While different Christian traditions may disagree on some of the finer details here, Christians are in broad agreement that nature is God's creation, that humans are made in the image of God, that God is uniquely revealed in the human person of Jesus Christ, and that God's Spirit indwells believers. Each of these doctrines provide a strong foundation on which to defend science-engaged theology.

This leads to the second and more specific question within this objection: is the label 'science-engaged theology' really needed? Since science-engaged theology wants theologians to engage the sciences just like they already engage other disciplines, and if it is true that science-engaged theology should resist further institutionalisation (Perry and Leidenhag 2023: 46), then the special label for this activity, 'science-engaged theology' may harm, rather than help, science-engaged theology achieve its goals.

There are two further reasons why the label might be unnecessary. First, the activity that science-engaged theology seeks to describe has plausibly been going on for centuries without the need for such a label. It has been pointed out more than once that using the best knowledge of the day from other disciplines is something theologians have done for centuries – Origen, Tertullian, Augustine of Hippo, Aquinas, and many others can be easily pointed to here. Nevertheless, Perry and Leidenhag defend the need for the label 'science-engaged theology' to serve as 'a reminder' (2023: 1–3). In this way, they acknowledge that science-engaged theology is something that theologians once knew, but, it is implied, have since forgotten.

Second, if a label is necessary, then what is wrong with the pre-existing label of 'science-and-religion'? Perry and Leidenhag also seek to (at least partially) distinguish science-engaged theology from the larger field of science-and-religion (Perry and Leidenhag 2023: 7–21). Likewise, Peter Harrison describes science-engaged theology as a 'new mode of science-religion interaction' which 'enables a different kind of activity' than what is currently practised within the wider field of science-and-religion (2021: 476–477). By contrast, Mark Harris borrows a metaphor of the field of science-and-religion from Niel Henrik Gregerson (2014) – that of an octopus with many different arms – to suggest that science-engaged theology might be one of the arms, thereby remaining 'within an overall organic unity' with the wider science-and-religion field (Harris 2024a: 26–27). Capturing both of these

articulations of the relationship between science-engaged theology and science-and-religion, Leidenhag offers both the metaphor of ‘new monastic order emerging from within the pre-existing church’ and of ‘a reformation, a protest against some deeply entrenched mistakes’ (2021: 05:03–06:16). All parties seem to agree that the relevant mistake is the essentialism and generality of the terms ‘science’ and ‘religion’. However, it is not clear that ‘science-engaged theology’ is much of an improvement (Kamwendo 2023). It might be that more localized labels, such as astro-theology or autism theology, better captured the point, but at the cost of fragmentation.

The purpose of a label is not only to name an activity that already exists, but to galvanize and co-ordinate such activities in a new way (Leidenhag 2023a: 1). In this regard, ‘science-engaged theology’ has been a remarkably successful label. There is however a risk here: although science-engaged theology does not claim to seek to prioritize ‘the sciences’ over and against the use of other academic disciplines in theology, given the finite resources of any one theologian, it is inevitable that attention to (and sufficient training in) one set of tools will lead to the neglect of others. This leads to the second objection.

3.2 Is science-engaged theology scientistic?

This second collection of objections are gathered into the question: is science-engaged theology scientistic? The concern expressed in this question is that, despite protestations to the contrary, science-engaged theology makes theological reflection subservient, in some impermissible way, to the sciences (Leidenhag forthcoming). There are many different labels that could be used to refer to the different ways that such subservience might manifest: Is science-engaged theology motivated by scientism? Does science-engaged theology presuppose either metaphysical naturalism or a logical empiricist sensibility? Does science-engaged theology end up reducing theological discourse into scientific explanation? Does science-engaged theology enforce methodological naturalism upon theologians? If the answer to any of these questions is ‘yes’, then this would be a powerful objection against science-engaged theology because science-engaged theology is widely advertised to be a way to further shed the scientistic inclinations that plagued previous generations of science-and-religion scholars (see the ‘long story’ in section 1.2).

The answer to the above questions partly depends on the definition of the various labels and positions listed. Scientism, reductionism, naturalism, and empiricism are all heavily-debated terms within the philosophy of science, and all come in different forms. Broadly speaking, scientism is the view that scientific methods, theories, or practices are the primary, or even only, sources of true knowledge. All other disciplinary approaches are at best secondary, only to be used to complement scientific work (like logic in philosophy of science), or at worse misleading, and so best either reduced (or translated) into science

or jettisoned entirely (Hietanen et al. 2020; Stenmark 1997). As such, scientism claims that ‘religious beliefs must satisfy the same conditions as scientific hypotheses to be knowable, rationally believable, or real’ (Stenmark 1997: 24). At least some definitions of naturalism seem almost synonymous with scientism. For example, Michael Devitt defines naturalism as the view that ‘there is only one way of knowing: the empirical way that is the basis of science (whatever that may be)’, (Devitt 1998: 45). In addition to the application of scientific methods to all areas of enquiry, methodological naturalism is also presented as a view about scientific methodology itself. Namely, scientists should bracket out any theological considerations or religious commitments when doing science (Torrance 2017).

It must be determined whether any of the above accurately describe science-engaged theology, and, if so, if that that is a problem. This section will start with an outline of how science-engaged theology could plausibly be accused of scientism, reductionism, naturalism, logical empiricism, and what problems such an accusation would raise, if correct. Subsequently, it will outline why science-engaged theology does not, or at least does not need to, fall foul of this objection.

It is easy to see how science-engaged theology might be accused of methodological scientism and reductionism. Science-engaged theology could appear to instruct theologians to swap out theological methods (biblical exegesis, dialogue with conciliar and ecumenical commitments, listening to marginalized communities, practices of prayer and contemplation, etc.) with scientific methods, thereby reducing theology into a science. For example, Leidenhag has suggested that, rather than merely gleaning insights from other scientific fields,

> the science-engaged theologian should seek to partner with scientists trained in empirical methodologies, in order to formulate a hypothesis, design a suitable test, and interpret the results. (Leidenhag 2023a: 4)

Perry and Leidenhag also readily employ a linguistic metaphor of science-engaged theology as ‘speaking pidgin’, which is at least related to translating (reducing) theories and concepts from one discipline into another (Perry and Leidenhag 2023: 43). Given that confessional Christian theology often has salvific or normative-ethical impetus within it, integrating science into theology might seem to propagate Mary Midgley’s concept of scientism: ‘the idea of *salvation through science alone*’ (Midgley 1992: 37, original emphasis).

Both scientism and reductionism would be a problem for science-engaged theology. If science-engaged theology leads to a methodological scientism or reduction *in toto* – that is, a total replacement of theological methods and concepts with scientific ones – then it

would raise the question: is science-engaged theology really theology at all? Moreover, although some scientists may want to engage in such a project, not many theologians would be motivated to do so.

It is also possible to see how science-engaged theology might be accused of enforcing naturalistic methods onto theology, thereby leading to the bizarre situation where the theologian must bracket-out theological commitments or concerns in their work. Indeed, Perry and Ritchie (2018) introduced science-engaged theology to the world in a paper defending methodological naturalism.

Finally, there is the question of logical empiricism. Logical empiricism is a movement within early twentieth-century analytic philosophy. This is relevant in part because of the large amount of sociological and conceptual overlap between the recent movements of analytic theology and science-engaged theology (Leidenhag 2023b; 2023a), and in part because of frequent use of the idea of 'verification' in Perry and Ritchie 2018. As Meghan Page points out,

> if analytic science-engaged theology requires transcribing scientific claims into 'sentences that can be formalized and logically manipulated', this program was attempt before and met unresolvable complications. This was, after all, precisely the hope of the positivists. (Page 2023: 21).

Having seen how science-engaged theology might plausibly be accused of scientism, reductionism, naturalism, and (resurrecting the spectre of) logical positivism, and why these would be a problem if true, the question remains: are these accusations accurate? Furthermore, even if they are apt descriptors of some science-engaged theology projects, is this necessarily the case? Can science-engaged theology avoid scientism, reductionism, naturalism, and/or logical positivism?

Although science-engaged theology could be done in a scientistic, reductionistic, naturalistic or logical positivist way, it need not be. Science-engaged theology, as envisioned by Perry, Ritchie, and Leidenhag, does not fall foul of any of these accusations. Since science-engaged theology does not advise theologians to use only scientific methods when investigating theological topics, it is not a form of scientism or naturalism. Likewise, not all forms of reduction are bad – it is sometimes helpful to examine, to translate, and even to reduce a topic to a level of explanation given by another discipline. This is not reductionism, so long as one does not suppose that explanatory reduction is always necessary or superior. Which level of explanation is most useful will depend on the kind of claim one is hoping to make, and what question one seeks to answer. In their defence of methodological naturalism, Perry and Ritchie had a rather idiosyncratic

(and toothless) definition of methodological naturalism in mind, namely that ‘standards of verification differ among disciplines’ (Perry and Ritchie 2018: 1073). Finally, in response to the charge of resurrecting logical empiricism, Page herself offers a way out of the dilemma she presents to analytic science-engaged theology. She calls this position analytic-synthetic science-engaged theology, which requires that the ‘theologian engages both science and theology holistically, and at deep conceptual and methodological levels’ (Page 2023: 24). Page’s description is entirely consistent with the view of science-engaged theology argued for by Perry, Ritchie, and Leidenhag.

3.3 Is science-engaged theology oppressive?

The third set of objections are that science-engaged theology is immoral or rids theology of its prophetic voice. This objection is best understood as coming from the perspective of liberation theology, where the central task of theology is to stand in solidarity with the oppressed by prioritizing practices of knowing found in the world’s most marginalized and oppressed groups. By contrast, scientific disciplines are taken to represent Western colonialist and patriarchal practices of knowing.

Robyn Boeré articulates this when, in responding to Perry and Leidenhag (2023), she writes the following:

> The scientific method(s) are one way of knowing about sin or an ocean or pregnancy or the human mind, but hardly the only way of knowing. There are also poetic, artistic, logical, intersubjective, and other modes of knowing. In fact, if one were to write a womanist account of theological anthropology, would one really want to turn to psychology, a field which not only has an acknowledged replicability crisis, but even more importantly, an acknowledged race and class issue? Similarly, there are good reasons to avoid scientific and medical data when writing on pregnancy. Is [science-engaged theology ...] capitulating to a different lens which has, both historically and in the present, distorted women’s realities and ignored women’s experiences? (Boeré forthcoming)

The challenge might be levelled in the following way: How can a theology that hopes to liberate and stand in solidarity with the oppressed ally itself so closely with disciplines that have been built upon the experimentation, exploitation, and even eradication of non-white, non-European, non-male, and disabled bodies?

The historical fault does not lie entirely with the sciences – theology has long been used to justify the oppression of women, Indigenous people, people of colour, the poor, and the disabled (see, for example, Mawson and Kolia 2024). Even a cursory survey of the history shows that some of the most horrific instances of such oppression occur when spiritual and scientific power and justification are combined. Science-engaged theology does not

claim to solve these all these problems on its own, and it should not be expected to do so. However, the question remains as to whether engagement with the sciences undermines, is compatible with, or stands in continuity with the fight for liberation and justice.

Another way this critique has been raised from a postcolonial perspective comes from Zara Thokozani Kamwendo (2023) and Matthew Elia (2024). Kamwendo argues that

> the distinction between theology and the social and natural sciences implicit in the definition of SET is a key part of the colonial agenda […] the notion of a theological approach that 'engages' with science is a manifestly modern notion. (Kamwendo 2023: 1–2)

To decolonize science-engaged theology, according to Kamwendo, is 'to reflexively interrogate […] what counts as valid science and what counts as valid theology in the science-theology intersection', and to confront 'the modern mythos of science as a despiritualized description of the natural world fundamentally distinct from religion', (Kamwendo 2023: 4–5). Citing the work of Clapperton Mavhunga on science and technology in Africa, Kamwendo writes: 'The spiritual and the technology [*sic*] are not in need of re-engagement because they were never *dis*engaged. We have never been modern'. (Kamwendo 2023: 6, original emphasis). Elia's critique is more due to 'the overall disinterest in the science-theology conversation up to this point' and 'how far we have yet to go in bringing science-engaged work into conversation with the enduring legacies of the colonial violence it helped produce' (2024: 41, 53).

There is no real tension between science-engaged theology and postcolonial liberation. While she goes beyond it in important ways, Kamwendo's description aligns with the essentially porous conception of disciplines in the academic 'trading-zone' presupposed by the science-engaged theology approach to interdisciplinarity (Perry and Leidenhag 2023: 44). Kamwendo argues that decolonizing science-engaged theology 'is not only viable but necessary' (2023: 2), because decolonialization is a congruent extension of the unsettling that science-engaged theology already brings to the wider field of science-and-religion. In line with what Kamwendo writes, Perry and Leidenhag explicitly deny that 'theological ideas and scientific findings are easily disentangled or that disciplines exist in hermetically sealed bubbles' (Perry and Leidenhag 2021b: 248). As Kamwendo writes, 'far from confusing the goals of teaching and doing SET, the decolonizing lens helps to crystalize it by opening a door to queering the distinction between science and theology' (Kamwendo 2023: 5). For the 'disruption of the governance of knowledge' (Kamwendo 2023: 7) to continue, however, science-engaged theology will need to become a far more globally-diverse field than is currently the case.

Similarly, Elia writes that his anti-colonial work ‘underscores even as it expands Perry and Leidenhag’s focus upon “entangled concepts”’, by arguing for ‘*conceptual entanglement from below* – that is, from the often erased and disavowed histories of colonial devastation in which both theological *and* scientific modernities are and remain implicated’ (2024: 57, original emphasis). He concludes by arguing that if science-engaged theology ‘can afford to face its [own] entanglements from below’, then ‘science-engaged theology renders itself ready to come alongside particular and urgent struggles for justice, for liberation – a project in which it has not yet been all that interested’ (Elia 2024: 57).

In conclusion, although science-engaged theology could perpetuate longstanding systems of oppression in both Christian theology and scientific research, it also offers a real opportunity to help correct such legacies by becoming increasingly self-reflective and global.

3.4 Is science-engaged theology blinkered?

The fourth objection against science-engaged theology focuses on its professed exhaustion with discussions of methodology. For example, Perry and Ritchie write, ‘our premise is that we should focus less on methodology’, and even ‘temporarily set aside questions of methodology’ (Perry and Ritchie 2018: 1088–1089). Davison (2022b: 2) notes that the ‘desire to demote matters of methodology to second place is perhaps the definitive hallmark of this [science-engaged theology] approach’. Elsewhere, he celebrates this demotion of methodology as ‘a sign of maturity in discussion between theology and science’ (Davison 2022a: 26). Although increased granularity has been widely applauded, it has also led to some concerns that science-engaged theology has ‘underestimated the relevance of long-running methodological debates in the science-and-religion field and overlooked large tracts of the sciences as well’ (Harris 2024a: 34).

Carmody Grey offers a critique against the suggestion that science-engaged theology can harmlessly set aside questions of methodology, even temporarily. She writes,

> the question of ‘method’ cannot be suspended. Modern natural science is not a set of facts that can be separated from their context and imported into other domains. It is a set of methods; and the methods *make* (*facere*) the facts (*facti*). (Grey 2021: 492–493, original emphasis)

Grey’s critique points out that the plea to temporarily suspend methodological considerations comes with a substantial risk and an even higher cost. The risk is that when engaging with scientific findings, and suspending consideration of the methods that made these discoveries, theologians risk falling into the most naïve scientific realism

on offer, and with it courting the problems of scientism outlined above. The higher cost is that the motivations and potential benefits of science-engaged theology – namely the intended increase of intellectual virtues such as accountability and rigor – are lost. Worse, the science-engaged theologian who does not attend to the wider network of practices and beliefs in which scientific theories sit will have no way to prevent such risks and costs. Like a blinkered horse, they might be free from distraction, but they also cannot see the full range of opportunities or pitfalls that lie before them.

Grey points out that what is needed for this highly-localized vision of science-engaged theology to succeed is not less consideration of method, but more of it – a great deal more. She writes,

> the granularity will not be lost, but it will have a different note: it will be *also* methodological; it will look at what is *making* knowledge 'knowledge' in any given instance, and it will bring that awareness into its reception of the discipline and the 'findings' under discussion. (Grey 2021: 494, original emphasis)

Arguably, this granular view of methodological reflection has always been a part of science-engaged theology, since 'method and content always go hand-in-hand' (Perry and Leidenhag 2021b: 248). For example, when Perry and Ritchie first introduced science-engaged theology they wrote the following:

> But what would happen if we set aside methodology, just for a minute, and state with some particular claim that is at home in one or another specific subdiscipline, *and then work out, as needed, points of methodology on an* ad hoc *basis*. This would be Science-Engaged Theology. (Perry and Ritchie 2018: 1086, emphasis added).

This, of course, is still no easy task. Harris writes that, 'to understand the nature of a science *as science*', requires 'time and patience', 'the formation of personal relationships with working scientists', and for theologians to 'get out of the library and into the laboratory', (Harris 2024a: 31–32, original emphasis). The need for a long-term commitment is also why Perry and Leidenhag write that 'science-engaged theology is not for academic tourists' (2023: 48).

However, Grey's critique goes further than merely pressing the point that engagement without at least granular ad hoc methodological awareness would be naive and irresponsible. Referencing the work of D. L. Schindler, she also argues that even granular scientific studies and theories come with, and are only made possible within, grand and implicit metaphysical systems of meaning; 'the whole […] intrudes into every part, the

universal into every particular' (Grey 2021: 494). This whole or universal is likened to a 'chessboard that no-one sees' (Grey 2021: 490). This chessboard is 'the background understanding of "world" or "reality" by which we identify and categorize "knowledge". Theology, as explicit discourse about ultimacy, has the particular burden of bringing that chessboard to light' (Grey 2021: 490). In short, Grey argues that science-engaged theology needs more theology of science (see section 4.2).

3.5 Is science-engaged theology superficial?

Finally, it must be determined whether engaging with science really makes a substantive difference to theology. The objection that science-engaged theology is superficial argues that science does not, and perhaps either cannot or should not, make a substantive difference to theological reflection. If science does not, cannot or should not make any difference to theological reflection, then there is no point in science-engaged theology.

The success of this objection depends upon the criteria for superficial versus substantial engagement. Jonathan Jong, who raises this concern, writes that

> the kind of difference I am looking for can be something like the difference that premises make to conclusions in valid arguments, or – fittingly enough – it might be like the difference hypothesized observations make to scientific theories. (Jong 2021: 484)

He gives some examples:

> Perhaps the science constrains the theological possibilities; perhaps it provides empirical evidence that adjudicates a dispute; perhaps it exacerbates or dissolves a challenge to some Christian doctrine. (Jong 2021: 484).

Perry and Leidenhag (2023: 54–58) suggest at least two ways to engage science. The first uses science to provide accountability and corroboration for theological claims, just as the theologian might call upon the historian or biblical scholar to check their work. However, Perry and Leidenhag argue that theologians should not revise their theology every time a scientific study is published presenting data that seems to falsify it. This is because, in scientific investigation as in science-engaged theology, declaring a theory falsified in light of empirical evidence is 'a free decision' or 'trial by jury' (Popper 2002: 92). The second form of engagement Perry and Leidenhag discuss is the idea of 'entangled concepts' and 'entangled claims', which require more than one discipline to understand (see Perry and Leidenhag 2023: 57–62).

Seeking to go beyond Perry and Leidenhag, Ignacio Silva and Gonzalo Recio (2023) argue that science-engaged theology

> opens the path to a large array of possibilities. Thus, there will be theological problems that are scientifically informed in their answers, others that would be scientifically backed, and others that would simply engage in a comparative dialogue for mutual enrichment. (Silva and Recio 2023: 11)

In light of this argument, it is clear that not all science-engaged theologians believe that science must always make a substantial difference to their theological work.

Jong himself offers some examples of acceptable, but non-substantial, forms of engagement. Science might 'play a rhetorical or pedagogical role in theology', like Augustine's exposition of the Trinity via analogy to human psychology (Jong 2021: 484). Science might inspire new theological reflections, even if it does not decisively change them (Jong 2021: 485, citing Visula 2021 as an example). Other examples Jong examines seem to him '*superfluous*: the point could have been compellingly made without any reference to the scientific research', (Jong 2021: 486; citing Lane Ritchie 2021, original emphasis). Interestingly, Jong argues that this shortcoming in much science-engaged theology is not the fault of theologians but occurs because many of the scientific concepts theologians engage with are 'too thin for theological use' (Jong 2021: 487). He concludes that 'science is a metaphysically dissatisfying enterprise' (Jong 2021: 488). Jong's surprising conclusion chimes well with Perry and Leidenhag's acknowledgement that their

> pluralistic stance […] curtails our ability to draw metaphysical conclusions from science […] if one wants to do metaphysics then perhaps the tools and methods of metaphysicians should be closer to hand, rather than those of empirical scientists. (Perry and Leidenhag 2023: 47)

Maintaining this gap between the sciences and metaphysics is a fundamental way for science-engaged theology is to avoid accidentally endorsing (metaphysical) naturalism (see section 3.2; Morganti 2024; Leidenhag forthcoming). Jong's conclusion is that 'the new science-engaged theology […] may well be inseparable from theology-engaged science' (Jong 2021: 488) and more of the latter is needed if the former is to succeed (see section 4.2).

4 Future directions for science-engaged theology

Several of the objections above have led to the conclusion that science-engaged theology needs either more theology of science, or more theology-engaged science, or both. The next section briefly outlines what these ideas are, and considers them as future directions for science-engaged theology.

4.1 Science-engaged theology needs more theologies of science

To respond to each of the challenges outlined in section 3, science-engaged theology needs (with some urgency) to be complemented by more theology of science. Perry and Leidenhag have argued that 'science-engaged theology necessitates a theology of science', not only in order to respond to these criticisms but also to live up to its promise (and premise) of 'embracing the inherent instability of 'science' and 'religion' as continually contested and entangled concepts' (Perry and Leidenhag 2023: 15).

Paralleling philosophy of science and sociology of science, theology of science examines the spiritual character and theological assumptions within scientific practices, theories, and communities. Mark Harris helpfully refers to theology of science as 'second-order reflection on the sciences' with at least three tasks: to make 'theological sense of the complex, organic, and diverse ('messy') reality of a scientific discipline'; to 'address key methodological and philosophical debates on the sciences from a theological angle'; and 'to draw out the theological, worldview and ethical assumptions implicit in that research' (Harris 2024a: 27). Since theology itself is a melting pot of disciplinary approaches used for the study of God, it is unsurprising that a theology of science can take several different forms. Three approaches will serve as examples.

The first is a theology of scientific commitments. Such a theology of science might be historical in nature, highlighting the theological commitments that made the origins of modern science possible (e.g. the intelligibility, order, and unity of the universe, the relationship between natural laws and a divine law maker, the connection between experiments and religious experience, or how belief in the epistemic consequences of sin motivated the founding of the Royal Society) and how these commitments have changed across time. This historical approach to the theology of science is tempting for Christian theologians because the centrality of theology to medieval and early modern science is undeniably profound (see Jaki 1978, and the chapters by Milbank, Pickstock, Oliver, and McLeish in Harrison and Milbank 2022). Often, such historical theologies of scientific commitments have an apologetic purpose – highlighting the theological basis of scientific inquiry is a way to articulate to a scientistic culture the relevance of theology.

However, there is a risk here. Even though Augustin Comte's positivistic narrative of historical epochs acknowledged the theological commitments of scientific inquiry in the past, the important point (for Comte) was that progress is seen in the lack of such theological undertones to science in the present. From the point of view of complementing

science-engaged theology, the more pressing (and underdeveloped) task is for theological analysis of contemporary scientific commitments, akin to philosophy of science. This is what Grey may be understood to mean when she spoke about 'bringing that chessboard to light' (2021: 490; see section 3.4). Which theological (Christian and otherwise) presuppositions are at play in contemporary science? For example, which normative definitions of flourishing or function are assumed in the human and ecological sciences? Which forms of causation or criteria of life is operative in contemporary biology? Answers to such questions will allow science-engaged theologians to be more critical and nuanced in their engagement with the sciences. As Harrison writes,

> certain scientific approaches might be grounded in implicit commitments that are inimical to some of the assumptions of Christian theology. This is particularly so for the social sciences [… which] have their own 'sacred project' which is in competition with that of Christianity. (Harrison 2021: 481)

If Harrison is correct here, then this would certainly be important for theologians engaging with sociologists and sociological methods to know.

A second approach might focus on the theology of science communication, examining the way that the popularization of science employs religious language and appeals to human spirituality, both through written publications, audio-video documentaries, and museums or interactive exhibitions (see Reid and Wilkinson 2021). Theologians who already specialize in theological analysis of the arts will likely be best-suited to this task. Such an approach is exemplified in the work of Mary Midgley and Lisa Sideris. Midgley's *Evolutions as Religion* and *Science as Salvation* exposed the deep gap between the ever-more narrow, modest, and existentially disinterested work of scientific research on the one hand and, on the other, the religious aspirations of an abstracted 'science' in the popular imagination. Similarly, Lisa Sideris explores how recent narratives in the environmental sciences function religiously by presenting the Anthropocene 'as a kind of myth that draws on [other more familiar] religious myths' (Sideris 2022: 03:30–03:46). Awareness of how theology already plays a part in science communication will provide a bridge between theologians and scientists, allowing theologians to offer important correctives to science as well as the reverse.

The third approach is a practical theology of science, because it will need to draw on the tools of the sociology of science in a way parallel to how practical theologians already draw on sociological methods of research. The tasks of a practical theology of science are to explore the role of (theistic or non-theistic) devotion and faith in scientific research and to explore the way that scientific institutions and norms of practice function as means of spiritual formation. The theology of scientific spirituality explores how the

cultures of institutions that research and teach science, and the training undertaken to become a scientist (either historically or in the present), inculcate habits of attending to, contemplating, and imaging the world around us in a particular way. For example, Rowan Williams describes 'scientific practices [as a] properly ascetic habit', comparable to, and therefore able to learn from, the long history of religious contemplation and spiritual formation (Williams 2022: 209; cf. Him Ip 2022). Tom McLeish also championed this approach when he wrote that: 'A Christian theology of science […] must also be responsive to and resonate with the lived human experience of doing science, especially when that endeavour is explored as a vocation' (McLeish 2022: 227). Vocation is an explicitly theological concept that has become commonplace, particularly with regards to medical professions. Practical theology of science is a necessary future direction for science-engaged theology, in part because science-engaged theology places its stress on scientific methods, practices, communities, and institutions (this stress is meant in contrast to forms of engagement that focus exclusively on theories, models, or data sets in a way abstracted from the people and practices that generated such knowledge).

Science-engaged theology needs not only to understand scientific theories, practices, and cultures, but needs to do so on its own terms – that is, theologically. More theologies of science will help science-engaged theology avoid the pitfalls of either blind trust (scientism) or a blinkered approach to scientific methods. Avoiding both pitfalls is necessary if science-engaged theology is to avoid participating in (and benefiting from) the oppression of marginalized communities. Theology of science is also well-positioned to help science-engaged theologians discern what type of impact a particular scientific theory or practice should (or can) have upon theology, whether that be a substantial or an appropriately more superficial impact.

4.2 Science-engaged theology and theology-engaged science

Just before the phrase science-engaged theology first appeared in print, Andrew B. Torrance coined the term 'theology-engaged science'. Theology-engaged science recognizes 'that the tools of theology can serve the task of science' (Torrance 2018: 1102). Kamwendo points out that, on its own, science-engaged theology has often seemed 'one-directional, with the sciences informing theology' (2023: 1). Theology-engaged science moves in the other direction, with theology informing the sciences. Perry and Leidenhag characterize theology-engaged scientists as asking 'how does theological discussion of x shed new light on, correct a distortion of, or corroborate the discussion of y in the sciences?' (2023: 63).

For some, it is almost unnecessary to say that theology-engaged science is needed as a future direction of science-engaged theology, because the two are 'inseparable' (Jong 2021: 488). Mark Harris (echoing Jong) writes: 'I can see no great difference between

these two terms once the wider issues of the context and methodology are taken into account' (Harris 2024a: 24). There is almost certainly truth to these claims. However, science-engaged theology and theology-engaged science look quite different in practice. Scientific and theological tools, methods, theories, and practices are not a one-to-one swap. What it even means for something to be a 'method', or a 'theory', differs across disciplines. Failure to appreciate these differences is likely to result in inappropriate forms of engagement, where one discipline tries to simply replace the other.

The asymmetry between science-engaged theology and theology-engaged science also arises from the scope of theological and scientific disciplines. As Andrew Davison has argued, since the scope of theology's enquiry is God and everything as it relates to God, 'the sciences naturally fall within the subject matter of theology, but theology is not part of the subject matter of the sciences' (Davison 2022a: 7). This leads to the conclusion that

> there are legitimate reasons for the one-sidedness in the relationship because scientists, for the most part, do not need to consider theology when they conduct their work, whereas theologians do need to consider the sciences. (Davison 2022a: 7)

The question of whether theology-engaged science is necessary or beneficial to science-engaged theology will turn on the issue of whether scientific knowledge is impacted by the theological beliefs and practices of scientists (past and present). Since this is not an easy question to answer, theology-engaged science is currently rather rare and controversial, even amongst theologians.

However, theology-engaged science might operate in a more modest way as the self-reflection of scientists on their own presuppositions and practices using the resources offered to them by theologies of science. Indeed, Torrance's original articulation of theology-engaged science broadly follows this idea of applying the theology of science to the day-to-day work of Christian scientists. Torrance writes: 'because the Christian scientist recognizes that theological information makes a decisive difference to how we interpret the empirically accessible history of the natural order', then

> this has implications for how we think about the intelligibility and rationality of the contingent order (the conditions under which science exists), the obligation to be ethically responsible in scientific research, and so on. (Torrance 2018: 1102)

The issue of ethical, responsible scientific research connects back to Kamewendo's and Elia's arguments (section 3.3). If science-engaged theology is to be properly decolonized, then there will need to be a two-way, reciprocal influence between the sciences and

theologies in order to disrupt the ‘governance of knowledge’ (Kamwendo 2023: 7) and emancipate the sciences from some of their more oppressive assumptions and practices. This would imply that theology-engaged science is not only an insider-imperative for religiously-minded scientists, but a moral imperative for all scientists.

Although some have suggested that theology-engaged science is inseparable from science-engaged theology, it seems that the two are distinct activities, done by different groups (i.e. theologians or scientists, respectively), and for different reasons. In contrast to theologies of science, it seems that science-engaged theology does not need scientists to become theologically engaged in any strong sense (even if it would benefit scientists to do so). In a weaker sense, science-engaged theologians seeking to collaborate with scientists will, in practice, need scientists to engage with them and aid them in their work.

5 Conclusion

Many contemporary theologians are successfully engaging science, either by collaborating with scientists or drawing on scientific literature and methods to test or further their theological work. Most do so without agonizing over the precise definition of ‘science-engaged theology’. However, a small group of scholars have offered various metaphors to emphasize different aspects of science-engaged theology and bring greater self-reflection to this movement. Another way to reflect upon the nature of science-engaged theology is to ask: how did we get here? As outlined in section 1.2, there are three ways to answer this question. Weaving the three stories of science-engaged theology’s intellectual context together, one can conclude the following: science-engaged theology is the result of a growing awareness in the field of science-and-religion that the ordinary meaning of the terms ‘science’, and ‘religion’ are the result of the demise of theology’s authoritative status in Western society. To combat this, science-engaged theology is part of a recovery of confidence among theologians, which reminds theologians that they have an equal place in the increasingly multidisciplinary context of contemporary research universities.

That said, science-engaged theology is not only relevant for academic theologians working in research universities. In section 2, it was seen that a wide variety of science-engaged theology projects have direct relevance to the life of ordinary believers and church leaders. This relevance is not accidental. Science-engaged theology’s concrete questions, pragmatic approach, inherent specificity, and use of empirical evidence means that this movement is likely to be more directly applicable to the day-to-day life of faith than many other theological movements.

Section 3 outlines various objections that have been levelled against science-engaged theology in the form of five questions. Combined, this section asked: Is science-engaged theology needed, scientistic, oppressive, blinkered or superficial? The answer to the question of whether theologians need to engage the sciences will depend on what the

goal of theology and the scope of God's revelation is taken to be in any given context. However, it was suggested that various Christian doctrines (i.e. creation, incarnation, etc.) provide a strong theological reason to suppose that engagement with the natural and human sciences is beneficial, if not necessary, to achieve theology's various goals. The label 'science-engaged theology' is necessary only for the practical end of galvanizing and co-ordinating scientific engagement across disparate theological communities. It may be that one day all theologians will be so accustomed to engaging the sciences that such a label is either not necessary or refers only to the few who dedicate their entire careers to this task.

The second objection asked whether science-engaged theology is scientistic – that is, whether it makes theology subservient to science by attempting to naturalize or reduce theology. The third objection asked whether science-engaged theology is oppressive – that is, whether it perpetuates the oppression of marginalized communities through scientific (and theological) research. The fourth objection asked whether science-engaged theology is blinkered – that is, whether its disavowal of methodological considerations makes it unable to see and avoid pitfalls like scientism and oppression. These three objections are grouped together in this conclusion because the analysis of all three takes a similar shape. In all three cases, it is clear to see why these worries have arisen, and there is some plausibility to each objection. However, science-engaged theology need not fall foul of any of these critiques, and already contains within it the principles needed to combat such problems.

The final objection considered in section 3 accused science-engaged theology of superficiality. This objection raises the interesting question of what kind of difference scientific research should make, or even can make, within theology. There are many different ways that theologians might engage with scientific research. While some of these may be 'substantive' (in Jong's sense), many others will be appropriately 'superficial' (Jong 2021: 484). This does not mean that science-engaged theology is not worth pursuing, as there are many other benefits to scientific engagement apart from that of making a substantive difference to doctrine.

Finally, two avenues for future development were offered. Both move beyond science-engaged theology into neighbouring forms of interaction between theology and the sciences. Theologies of science examine the theological assumptions and spiritual character of scientific theories, practices, and communities. Drawing on the expertise of other theological sub-disciplines, it was suggested that the theology of science could be historical, philosophical, literary, or practical in nature. Furthermore, science-engaged theologians urgently need such theologies of science, if they are to more convincingly respond to each of the problems outlined in section 3. The second avenue for future development is theology-engaged science. Although science-engaged theology and

theology-engaged science might appear to be two-sides of the same coin, they are rather different exercises. Theology-engaged science would be a welcome addition to science-engaged theology, but it is not strictly necessary for the future flourishing of science-engaged theology.

Attributions

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