

ENGAGING SCIENCE IN SEMINARIES:  
HOW SCIENCE IS REPRESENTED IN THEOLOGICAL SCHOOLS,  
FROM FOUR VENUES

A report on how institutions  
differ in their treatment of science across four venues—  
courses, public lectures, collaborations, and webpages.

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## **INTRODUCTION**

There was a time when people of faith were leading in the scientific discoveries of their day. Now there is a line between science and religion, and the two disciplines work at the margins of each other at best. While theologians have much to say about existence and humanity, and play important roles in serving society, how they involve science in that work is limited. In the coming pages, I report the results of a study on the various ways seminaries in the United States and Canada engage science. The goal is not only to understand the way seminaries involve the sciences in the work that they do, but to also identify immediate opportunities for increasing the presence of science in theology schools. In the following sections, I unpack how seminaries treat science across four venues. The conclusion identifies opportunities for science intervention.

### **The Study**

The Association of Theological Schools (ATS) conducted a document collection study on how theological schools engage science from July 2016 to February 2017. It entailed a document collection phase and data analysis phase. Each institution involved in the study had a data collector who was instructed to collect documentation that captures the greatest breadth in science engagement. In the analysis phase, through a mixed methods approach, the project employed both quantitative and qualitative data coding and analysis techniques in order to triangulate findings. In addition to univariate and bivariate statistics, textual analysis techniques were used to nuance findings.

This report is organized according to the four venues of the project's inquiry: (1) courses, (2) public lectures, (3) collaborations and partnerships, and (4) websites. In each of the chapters and to varying degrees, I compare across six institutional factors, asking how (a) religious tradition, (b) regional differences, (c) institutional structures, (d) faculty and student head count, (e) research institution status, and (f) Historically Black Theological School (HBTS) status shape science engagement in ATS schools.

### **A Note about Textual Analysis Methodology**

Each document was read and mined for scientific or technical jargon. Scientific and technical jargon includes mentioning a specific type of science (e.g. physics, psychology), a feature of a science field (e.g. clinical, excavations), scientific methods and practices (e.g. hypothesis testing, ethnography), a historical or contemporary famous science scholar (e.g. Darwin, Christian Smith), medical or other health conditions, and so forth. Some theoretical concepts and jargon were considered scientific as well (e.g. social capital, systems theory). Theological and figurative words were not counted as science. It was not enough to say "creation," for example; a course document had to mention the environment, ecology, cosmology, the natural world, evolution, and so forth, in order to be counted as science. On that note, words like "environment" and "nature," which vary widely depending on the context (e.g. natural environment vs. social environment) were only counted if the contextual usage implied a more technical or scientific understanding. In the "environment" example, the word had to refer to the natural world (plants, animals, etc.) and not cultural or other setting human individuals live or interact in. This could create some challenges for social scientific terms to be counted as science, but as will become evident, the social sciences in fact represented a considerable portion of seminary documents.

For course documents, textual analysis techniques were used to gauge each course's level of science integration. These were coded as (0) no, (1) light, (2) moderate, and (3) heavy science integration. Only a few mentions of scientific and technical words or phrases were considered "light" or "low" science integration, while several (7-plus) mentions throughout the document were considered "heavy" integration. Anything in between was "moderate" treatment of science. It should be noted that repeat words or phrases, or even derivatives (e.g. psychology vs. psychological) were not counted twice.

These scientific or technical words or phrases were also used to gauge the type of science being used in a course, lecture, or collaboration.<sup>1</sup> Types of science include (1) soft, (2) hard, (3) both, or (4) unclear. The difference between soft and hard science has to do with exactitude and objectivity, the methodological rigor involved in how strongly a hypothesis can be tested and accepted or rejected. Hard sciences include the physical sciences (e.g. physics, chemistry, geology), cosmology (e.g. astronomy, astrophysics), life science (e.g. biology, genetics), earth science (e.g. ecology, environmental science), technology, and medical sciences. Soft sciences include psychological sciences (e.g. psychology, cognitive science) and social sciences (e.g. sociology, anthropology). The few courses with history or philosophy of science were generally treated alongside the kind of science they describe.

Lastly, much of the textual analysis results are reported using normalized weights.<sup>2</sup>

## Overview of the Sample

As seen in Table 1, there are 28 institutions in the sample. They are regionally dispersed into four U.S. regions<sup>3</sup> and Canada: 5 are in the west, 4 in the northeast, 8 in the south, 7 in the midwest, and 4 in Canada. There are 18 different U.S. states represented and 2 Canadian provinces. Half of these institutions (n=13) are freestanding seminaries. The rest (n=15) are embedded or somehow affiliated within a larger university structure.

School Name [REDACTED FOR PURPOSES OF WEBSITE PUBLICATION]	Region	Protestant Tradition	Structure	Size of Full-Time Faculty	Size of Student Body	Research Institution?	Historically Black Theological School?
	Canada	Mainline	Embedded	Small	Small		
	Canada	Evangelical	Embedded	Small	Small		
	Canada	Evangelical	Freestanding	Medium	Large		
	Canada	Evangelical	Embedded	Large	Large		
	Midwest	Evangelical	Embedded	Large	Large		
	Midwest	Pentecostal	Freestanding	Small	Large		
	Midwest	Evangelical	Embedded	Medium	Large		
	Midwest	Evangelical	Freestanding	Large	Medium		
	Midwest	Mainline	Freestanding	Small	Small		
	Midwest	Evangelical	Embedded	Small	Small		
	Midwest	Mainline	Embedded	Medium	Small		
	Northeast	Mainline	Embedded	Large	Large	Yes	
	Northeast	Mainline	Freestanding	Small	Small		
	Northeast	Mainline	Freestanding	Medium	Large		
	Northeast	Mainline	Freestanding	Large	Medium		
	South	Evangelical	Freestanding	Large	Large		
	South	Mainline	Freestanding	Large	Medium		
	South	Mainline	Embedded	Large	Large	Yes	
	South	Mainline	Freestanding	Small	Small		Yes
	South	Mainline	Embedded	Medium	Small	Yes	Yes
	South	Pentecostal	Embedded	Medium	Medium		
	South	Pentecostal	Freestanding	Medium	Small		
	South	Mainline	Embedded	Medium	Small		
	West	Mainline	Freestanding	Small	Small		

<sup>1</sup> Website results were too inconsistent to gauge soft and hard science treatment. Plus, website analysis was better served through the use of a different typology, specifically the website section.

<sup>2</sup> Dedoose, which is the qualitative research software used to code and analyze these data, has a built-in normalization function. It basically assigns “a weight of ‘1’ to the class with the largest number of members (basis class) and then assigns weights to the other classes as a function of the numeric relation between the number of members in the class to that of the number of members in the ‘basis’ class. These weights are then used to adjust the number of raw counts to accomplish ratio equivalence across class for visualization and the weighted percentage is calculated based on these adjusted counts.” For more on how this is calculated to unbiased the data, see Dedoose, ‘Analysis and Filtering’, in *User Guide* (<http://www.dedoose.com/userguide/analysisandfiltering/normalization>).

<sup>3</sup> Regions are based on U.S. Census divisions.

	West	Evangelical	Freestanding	Large	Large		
	West	Evangelical	Embedded	Small	Large		
	West	Evangelical	Embedded	Small	Small		
	West	Evangelical	Embedded	Medium	Small		
*Small, medium, and large categories are defined in comparison to schools in the sample, such that small represents the bottom third and large represents the top third. Head count distributions in each category are as follows: Full-time faculty: <12="Small," 12-16="Medium," >17="Large"; student head count: <248="Small," 248-318="Medium," >318 "Large."							

Drawn from ATS' latest Annual Data Tables (2015-2016) were the number of full-time faculty teaching at each institution, as well as the head count enrollment of students. The average number of full-time faculty per school in the sample is 20, ranging from 6 to 81.<sup>4</sup> The student headcount, on the other hand, ranges from 56 to 3,199 per school, with an average student body of 469. For the sake of analysis, these values were divided into thirds and recoded with "small" representing the bottom 33% of schools in the sample and "large" representing the top 33%.

The sample also varies in other characteristics. In terms of their ecclesial family, 13 institutions are Mainline Protestant and 15 are Evangelical Protestant.<sup>5</sup> There are also 2 Historically Black Theological Schools (HBTS) in the sample and 3 research institutions.

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<sup>4</sup> Full-time faculty are those whose positions allot 50 or more percent of their time to teaching and/or research.

<sup>5</sup> Here, the one Seventh-Day Adventist institution—[SCHOOL NAME]—is collapsed into the Evangelical category, as well as three Pentecostal institutions. In certain analyses and findings throughout this report, Pentecostal institutions are separated out, based on salience of patterns.

## CHAPTER 1: COURSES

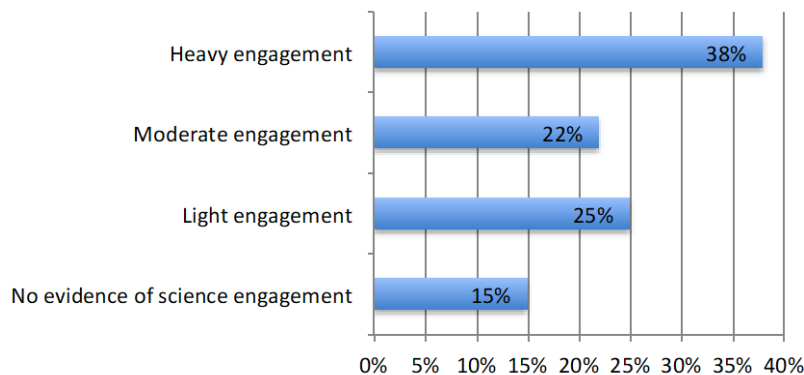
In the sample there are 498 courses represented by catalog entries and syllabi documentation.<sup>6</sup> Data collectors were also asked a series of questions about each course, such as how often it was offered, in what term, and whether it was required. While data collectors were asked to submit science course offerings specifically, textual analysis techniques determined that some courses did not provide sufficient evidence to necessarily qualify as scientific. This was more often the exception than the rule, but statistics on course offerings may be calculated with some courses that have little to no treatment of science.

### A Sketch of Science Courses in Seminaries

Some institutions offered more course data than others. Twelve schools submitted 10 courses or fewer, thirteen submitted between 11 and 20 courses, and three notable institutions submitted more than 20 courses, ranging up to 76 courses. A majority (57%) of these science courses are offered frequently—43% of the courses listed are offered yearly and 14% are offered more than one time per year. A notable 22% of courses are offered every 2 to 3 years, while 4% of the science courses are offered less frequently (3 to 7 times per year).<sup>7</sup> Otherwise, 18% of the courses are only offered one time (14%) or represent some other special circumstance (e.g. it is a special course, new to the curriculum, or the frequency varies, 4%). In terms of when in the academic year science courses are offered, 44% are offered in the Fall term, 14% in the Winter term, 36% in the Spring term, and 14% in the Summer. These shares are not mutually exclusive, as some courses (18%) are offered in 2 or more terms.

Textual analysis revealed that 15% of the courses submitted had no evidence of science engagement, 25% had light science treatment, 22% had moderate treatment, and 38% had heavy treatment (see Figure 1).<sup>8</sup> That is, almost two out of five science courses in seminaries represent substantial integration of science. Almost half (49%) of seminary science courses employed the soft sciences, while 28% employed the hard sciences. A noteworthy 16% integrated both soft and hard science, and 6% were too unclear to code or had unspecific “science” in their courses. Larger shares of seminary courses demonstrate heavy and soft science engagement.

**Figure 1: Percent of Seminary Courses at Each Level of Science Engagement (n=421)**



<sup>6</sup> 53 courses are missing from some analyses because they were not uploaded directly into the data questionnaire but were submitted by data collectors separately. Analysis conducted in this report was based on the nearly 500 cases that were uploaded.

<sup>7</sup> There is an overlap in the ranges because six cases were offered every 3-5 years and these lined up more closely with the less frequently offered courses than the courses that were specifically offered every 2-3 years.

<sup>8</sup> Light science courses only mentioned scientific or technical words or phrases at most a few times. Moderate science courses mentioned scientific or technical words or phrases 4 to 6 times. And heavy science engagement consisted of 7-plus unique mentions of science.

Courses were also assessed on the relationship between science and religion, which was based on the context of science terms in the document. These fell into two primary categories: *dialogue* and *faith using science*. A majority (62%) of courses represented a *dialogue* between science and religion. Dialogue occurs when science is integrated as a conversation partner to theology. Whether in assigned readings, the subject-matter for a weekly session, or in a writing assignment, dialogue is marked by an interest in forming the students' ideas rather than their behavior. Another type of relationship between science and religion is *faith using science*. This occurs when science is being appropriated and used to shape practice and ministry. This was especially common in counseling courses, which drew from psychology to inform a student's approach to therapy. This also includes using science to construct valuable practices in crisis ministry, urban ministry, caring for the environment, and so forth. Having students use scientific methodologies like statistics, ethnography, and case study research to be more thoughtful ministers and members of society also counted as faith using science. There were also some courses that used anthropology, archaeology, and other such sciences for the sake of understanding the biblical text and times. A sizable 24% of courses demonstrated faith using science. While it is possible for a course to demonstrate both dialogue and faith using science, I coded the most dominant relationship first.

*Are science courses integrated into an institution's curricular requirements or relegated to optional elective credits?* Over half (53%) of the courses offered are required for one or more of the following degrees: academic masters, professional masters, M.Div., D.Min., or Ph.D. Academic masters are degrees students pursue on their way to earning a Ph.D. and typically do not require practical ministry courses. Professional masters, and even D.Min.'s to an extent, are degrees that usually have practical courses as part of the required curriculum and are pursued by those who want to work in church or ministry settings. Of the science courses offered, 17% are required for academic masters, 14% are required for a professional master's degree, 34% are required for an M.Div., and 6% are required for both the D.Min. and Ph.D.

Science course requirements took a few different forms in seminaries. In several cases, science-related courses are required for a degree or concentration. Such was the case in some of the M.A. programs offered at [SCHOOL NAME]. This freestanding Evangelical seminary offers both soft and hard science courses as part of their Intercultural Studies, and Philosophy and Apologetics degree program. These are science courses required for characteristically unscientific degree programs.

In other cases, science courses are required for the handful of science-related certifications offered at seminaries. Some examples are the Ph.D. in Biblical and Ancient Near Eastern Archeology at [SCHOOL NAME]; the Theology, Medicine, and Culture Certificate at [SCHOOL NAME]; and the two degree tracks on Social Science Approaches to Religion or Scientific Approaches to Religion at [SCHOOL NAME]. A notable share of these science-degree plans or tracks also involved taking courses at umbrella institutions, in the case of embedded schools.

Some science courses also fulfilled requirements for professional and practical certifications, like a certification to be a Clinical Sexual Addiction Specialist with the American Association of Certified Christian Sexual Addiction Specialists at [SCHOOL NAME], or the certification for the clinical Ph.D. program from the American Psychological Association (APA) at [SCHOOL NAME], or even the accreditation to be a counselor offered by the Council for Accreditation of Counseling and Related Educational Programs at [SCHOOL NAME]. Thus, some seminary courses are linked to and accredited by external organizations for their certification standards.

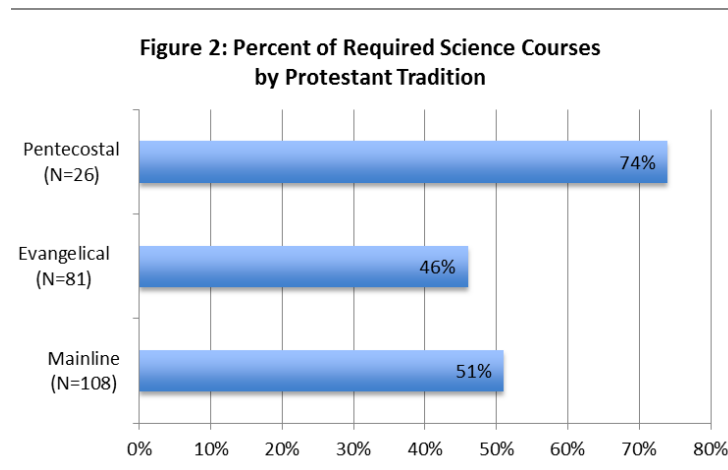
It is worth inserting that a few science-related courses were part of a string of courses, either the first in a lineup or having a series of pre-required courses in order to enroll. This suggests that some science courses in seminaries are out of reach to some students who do not meet the prerequisite requirements.

## **Factors That Shape Curriculum at Theological Schools**

### ***The School's Ecclesial Family***

Of the courses listed, half (50%) were submitted by Mainline institutions, 44% were submitted by Evangelical institutions, and 8% were submitted by Pentecostal institutions. Even though Pentecostal institutions represent the smallest share of science courses, they stand out for being more likely to require

science courses, as Figure 2 shows.<sup>9</sup> [SCHOOL NAME] could be driving the difference here as they offer a Master of Arts in Clinical Mental Health Counseling that requires a variety of psychology and counseling courses.



In terms of how frequently institutions offer science courses, both Pentecostal and Mainline institutions have similar tendencies to offer courses frequently or infrequently.<sup>10</sup> Pentecostal schools stand out for having the largest proportion of frequent (one or more times a year) science courses, and a similar-sized share of Mainline school courses are offered multiple times throughout the year. Yet, Pentecostal schools also have a high share of less frequently offered science courses (every 3 to 7 years) alongside Mainline institutions, which also have high shares of courses being offered only one time or are otherwise special courses. Evangelical institutions, in contrast, tend to fall in the middle, as they have a large share of courses offered every 2 to 3 years.

Evangelical institutions are much more likely to demonstrate heavy science engagement. [SCHOOL NAMES] are examples of Evangelical schools with large shares of courses with heavy science integration. Pentecostal school courses vary widely in their level of science integration. [SCHOOL NAME] is an example of the variation, as a third of their courses demonstrate moderate science engagement, another third demonstrate no science engagement, and the rest are split evenly between heavy and light science engagement.

Pentecostal institutions are the least likely to engage the hard sciences and the most likely to engage the soft. All but one course<sup>11</sup> at Pentecostal schools were soft science courses. These mostly revolved around counseling psychology, practical ministry, and missional courses. In contrast, Mainline institutions are the least likely to engage the soft sciences and are similarly as likely as Evangelical schools to engage the hard.

As for the relationship between science and religion demonstrated in these courses, Evangelical schools stand out for being more likely to both (a) put science and religion in interdisciplinary dialogue and (b) offer courses that use science for practical purposes. Mainline and Pentecostal schools are equally as likely to demonstrate dialogue or faith using science in their courses.

Before moving on, one Pentecostal institution, whether deliberately or not, raised awareness of science through the formatting requirements of their syllabi. Each syllabus at [SCHOOL NAME] included two components that arguably increased science exposure to their students. The first component is a list of university policies, which held that academic dishonesty included creating “results for experiments, observations, interviews, or projects that were not done.” Students are instructed not to fabricate empirical findings. The second component in their syllabi were “cognitive,” “affective,” and “behavioral” learning

<sup>9</sup> Statistically significant at the  $p < 0.01$  level. Shares calculated from the total number of courses listed.

<sup>10</sup>  $P < 0.001$ .

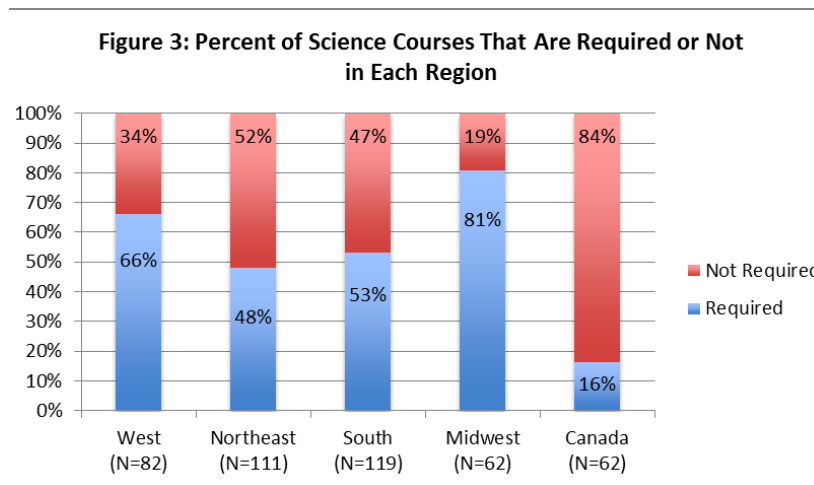
<sup>11</sup> The hard science Pentecostal course was taught at [SCHOOL NAME]. This course—“Genesis 1-11 and Science”—was actually the only science course submitted by this institution’s data collector.



outcomes. This is technical language based on social scientific theory. This institution, then, has to some extent familiarized and exposed their students with scientific theory and methods. To whatever degree this is actually shaping the student's learning is yet to be measured, but this does represent a more central and structural incorporation of scientific language in their syllabi.

### **Regional Location**

Like the religious tradition of the institution, the regional location of a seminary matters for whether they offer and requires science courses in their curriculum. Institutions in the western and southern regions of the United States are more likely to offer science courses, and the northeast and midwest are less likely.<sup>12</sup> As seen in Figure 3, schools in the west and midwest are more likely than schools in other U.S. regions and Canada to *require* science courses in one or more of their degree tracks. Canadian schools are the least likely to require science courses.<sup>13</sup> Overall, it appears schools in the U.S. west are more likely to both offer and require science courses. One school that could be driving the difference is [SCHOOL NAME], which offers multiple degrees in psychology.



While both southern and midwestern schools have the largest shares of science courses offered annually, northeastern schools stand out for offering science courses very frequently (more than one time per year). Western schools, on the other hand, are the least likely to offer them more than one time per year. The west and northeast also have strong representation in courses offered every 2 to 3 years. In contrast, Canadian institutions have the largest shares of courses offered every 3 to 7 years or are only a one-time event or other special program.<sup>14</sup>

There are no strong regional differences in the level of science engagement in seminary courses, but northeast schools are the least likely to engage science heavily and southern schools are more likely to have moderate science treatment.

In terms of the types of science, Canadian, western, and southern schools appear equally more likely than northeastern and midwestern schools to engage the soft sciences in their courses. Southern schools appear additionally more likely to engage the hard sciences in their courses, and northeastern schools are less.

As for the relationship between science and religion, southern and western schools are more likely to use science for practical purposes. Canadian and western schools are instead more likely to treat science and faith as a dialogue.

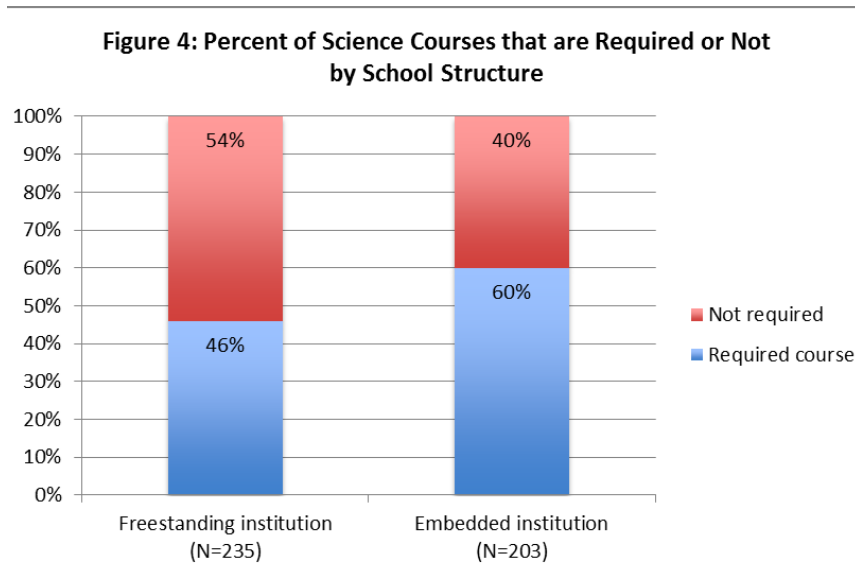
<sup>12</sup>  $P < 0.001$ .

<sup>13</sup>  $P < 0.001$ . Shares calculated from the total number of courses listed.

<sup>14</sup>  $P < 0.001$ .

## *Institutional Structure*

Institutional structure matters for how science is treated in seminaries. Embedded institutions are more likely to offer science courses than freestanding institutions (68% vs. 51%).<sup>15</sup> As seen in Figure 4, embedded institutions are also more likely to require science courses.<sup>16</sup>



Institutions with either type of structure vary in how often they make science courses available to their students.<sup>17</sup> For example, freestanding institutions are more likely than embedded institutions to offer science courses very frequently (more than one time per year) and embedded institutions are more likely to offer them just frequently (one time per year). In contrast, both freestanding and embedded institutions appear equally as likely to offer science courses less frequently (every 3 to 7 years), including as one-time events.

Embedded and freestanding institutions are equally as likely to heavily engage science. Some examples of freestanding schools with heavy science engagement [SCHOOL NAMES]. [SCHOOL NAME] and [SCHOOL NAME] are examples of embedded schools with heavy science engagement.

Similarly, embedded and freestanding schools are equally as likely to offer hard science courses. However, embedded schools stand out for being more likely to offer soft science and both soft and hard science courses. [SCHOOL NAME] and [SCHOOL NAME] are two embedded schools that offer the most courses in soft science, a great majority of which are in the fields of counseling, therapy, or practical theology.

As for the science-religion relationship, embedded institutions are slightly more likely to offer courses that demonstrate science being used to shape practices and behaviors. Some of the embedded institutions that demonstrate faith using science included courses that (a) used psychology to care for trauma victims and other mental health conditions, (b) used family systems theory and genograms to shape ministry to families and youth, (c) used the social sciences for practical theology purposes, like ministering to people with disabilities and advancing reconciliation through leadership, and (d) used technology for ministry purposes.<sup>18</sup> Freestanding institutions, on the other hand, are not too far behind embedded institutions in putting science and religion in interdisciplinary dialogue.

<sup>15</sup>  $P < 0.01$ .

<sup>16</sup>  $P < 0.01$ .

<sup>17</sup>  $P < 0.05$ .

<sup>18</sup> These results are based on an analysis of embedded schools with larger shares of “faith using science” courses. These are [SCHOOL NAMES].

### ***Faculty and Student Headcount***

The size of the institution, as measured by the head count of the student body and full-time faculty, does not seem to matter for the number of science course offerings, but it does matter for the level and type of science engaged. Small schools are generally more likely to offer courses with little to no science. This is likely because smaller seminaries have fewer resources to devote to curricula that are outside the standard scope of theology. In contrast, schools with large student and faculty bodies are more likely to demonstrate heavy science treatment in their courses. [SCHOOL NAME] and [SCHOOL NAME] stand out as two large institutions with high shares of courses that demonstrate heavy science engagement, [SCHOOL NAME] for psychology courses and [SCHOOL NAME] for anthropology.

Additionally, institutions with large student and faculty bodies are also more likely to engage the hard sciences in their courses. Here, [SCHOOL NAME] stands out as a large school with courses that touch on a variety of hard science topics, such as physics, biology, astrology, physiology, technology, genetics, bioethics, ecology, and agriculture. Soft science courses, in contrast, are more likely to occur in institutions with medium-sized faculty, or small- or large-sized student bodies. Courses that engage both the soft and hard sciences in interdisciplinary fashion are more likely to be taught in schools with larger student bodies—the head count of the faculty seems to matter little here. Thus, large schools demonstrate heavier science engagement and greater integration of the hard sciences than smaller schools.

As for the science and religion relationship, courses that demonstrate faith using science are relatively more common in schools with larger student and faculty bodies. Courses that demonstrate interdisciplinary dialogue, however, appears more common at institutions with large student bodies. Here again, schools with larger student bodies (and not necessarily large faculty bodies) are associated with interdisciplinarity, first to include both soft and hard sciences in their courses and, second, to be more likely to place science in conversation with theology. [SCHOOL NAME] is one example of an institution with a large student body, but small faculty, that offers dialogical courses, like their Theology and Stewardship of Creation series that mentions ecotheology, theological anthropology, ecology, agriculture, and other indicators of interdisciplinary dialogue.

### ***Research Institution Status***

There are three research institutions in these data: [SCHOOL NAMES]. While there are no statistically significant differences between research institutions and non-research institutions in offering and requiring science courses, or in the frequency of courses offered, textual analysis reveals some differences. Research institutions appear more likely to offer science courses at every level of analysis. This is because each research institution differs considerably from the others in its level of science engagement. For example, 88% of [SCHOOL NAME]'s courses demonstrated heavy integration of science, while 40% of [SCHOOL NAME]'s did, and none of [SCHOOL NAME]'s did.

Research institutions are also more likely than non-research institutions to engage the hard sciences in their coursework. [SCHOOL NAME] may be driving the difference here, as they tend to favor the hard sciences. Non-research institutions, on the other hand, are more likely to offer courses that integrate both the soft and hard sciences simultaneously. [SCHOOL NAME] is one notable non-research institution with a large share of courses that demonstrate both soft and hard science engagement. As for the soft sciences, both research and non-research institutions are equally as likely to offer science courses in the soft sciences.

Research institutions are more likely to use science for practical purposes (e.g. a Theology and Trauma course at [SCHOOL NAME]). Non-research institutions, on the other hand, are more likely to put science and religion in interdisciplinary dialogue (e.g. the Bible, Theology, and Science course at [SCHOOL NAME]).

It is worth inserting that two of the three research institutions in the sample offer degree tracks or certificates in science-related fields. [SCHOOL NAME] has a certificate in Theology, Medicine, and Culture, and [SCHOOL NAME] has two degree tracks on Social Science Approaches to Religion and Scientific Approaches to Religion. [SCHOOL NAME] also stands out for 55% of their courses explicitly having “science” in the title. Research institutions have scientific strengths.

### ***Historically Black Theological Schools (HBTS)***

There are two HBTS's in the sample: [SCHOOL NAMES]. These schools are more likely than others to require science courses in one or more of their degree tracks.<sup>19</sup> They are also more likely to offer science courses frequently (one or more times per year). And they are simultaneously less likely to offer such courses infrequently—every 3 to 7 years, or as a one-time or special course.<sup>20</sup>

A closer look at HBTS's shows there is room for more explicit treatment of science at these schools. Over 60% of their courses that evidenced science engagement had low or medium science integration. HBTS's were also less likely to have heavy science integration.

HBTS's are equally as likely as non-HBTS's to engage the soft sciences. In contrast, HBTS's are slightly less likely to engage the hard sciences. An institutional look reveals that [SCHOOL NAME] tends to favor psychology and counseling courses, while [SCHOOL NAME] is stronger in the interdisciplinary treatment of science in their theology and practical theology courses.

Overall, HBTS's are less likely to put science and religion in dialogue. The gap between HBTS's and others is thinned when it comes to the extent to which their courses use science for practical purposes. This could be because some of [SCHOOL NAME]'s courses demonstrated the use of science to inform ministry approaches.

### **The Presence of Scientific Assignments**

One feature of seminary courses that came up during qualitative analysis was the use of science-related assignments. These include, for example, a gardening assignment in a food course, conducting interviews or other forms of social scientific research and using the soft sciences to analyze patterns, creating genograms, using technology for ministry, participating in daily excavations, acting as clinicians in role-playing situations, engaging in statistical analysis, and participating in empirical studies (e.g. completing a survey). Most seminary science course assignments were social scientific exercises—conducting ethnography, interviews, and case study research—which draws attention to how compatible some scientific methods can be with theology. This suggests that one way to bolster the use of science in the curriculum is to assign students to visit a church or other site and record their observations in an analytical report. Even assigning them a short reading on how to conduct such field research will not only expose them to social scientific methods, but challenge them to think scientifically and in terms of evidence.

Some institutions are stronger in science assignments than others. First, southern schools are more likely to assign scientific assignments, and they are followed by Canadian schools, like [SCHOOL NAMES]. Schools with larger faculty and student bodies are more likely to have scientific assignments listed on their syllabi. In addition, Evangelical and Pentecostal schools are both more likely than Mainline institutions to have scientific assignments. Research institutions are also more likely than others to have science assignments. This is consistent with the tendency of research institutions to use science for shaping student practice. [SCHOOL NAME] is one large Evangelical southern school that contributed the most cases of scientific assignments, representing almost a fifth of the total. Most of their assignments revolved around ethnographic methodologies, no doubt due to their strengths in anthropology, but they also incorporated some technology-based assignments. This is one institution that is overall very strong in incorporating science into their curriculum.

### **Course-Related Science Collaborations**

In addition to the institutional collaborations created by science, which will be discussed in detail in Chapter 3, some science collaborations revolved around the classroom and deserve discussion here. For instance, some seminary courses brought together two professors—one science expert and one theologian. Other courses hosted guest lecturers to lead the scientific portion of the course. [SCHOOL NAME] stands as a good example of such practices. In one course, [SCHOOL NAME] brought together a professor of astrophysics from [NON-ATS SCHOOL NAME] and a [SCHOOL NAME] professor of religious ethics to

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<sup>19</sup> P<0.001.

<sup>20</sup> P<0.01.

teach a course called, “Science, Religion, and the End of the World.” In another course on pastoral care, [SCHOOL NAME] brought in two scientific guest speakers to talk about psychoanalytic and substance-abuse treatments. [SCHOOL NAME] stands out as one institution that fills curricular gaps by creatively integrating the expertise of science specialists.

## **Summary**

In this chapter, institutional engagement of science was analyzed according to the courses represented by catalog entries and syllabi documentation. It was found that western institutions are more likely to both offer and require science courses, and Canadian schools are overall less likely, as well as less likely to offer them frequently. Large schools are more likely to demonstrate heavy science engagement and integrate the hard sciences in their courses. Both regional location and school size appear to matter for whether an institution requires scientific assignments in their syllabi.

Within-group variation among groups also clouded some results. First, freestanding and embedded institutions both demonstrate tendencies to offer science courses both frequently and infrequently. Still, embedded institutions are overall more likely to offer and require science courses than freestanding schools. Second, some research institutions are similarly strong and others not as strong in integrating science. For that reason, research institutions are more likely to demonstrate both no science and heavy science engagement. In spite of that, one distinguishable tendency of research institutions is that they are more likely to engage the hard sciences. They are also noted for offering science degree programs. Third, both Mainline and Pentecostal schools offer science courses frequently and infrequently. For the most part, though, Pentecostal schools stand out for being more likely to require science courses and for being less likely to engage the hard sciences, but more likely to engage the soft. In contrast, Mainline and Evangelicals schools are similarly as likely to engage the hard sciences, and Evangelical schools additionally more likely to heavily engage science.

## CHAPTER 2: PUBLIC LECTURES

There are several different kinds of science public lectures represented in this dataset. “Public lecture” herein refers to a special speaking engagement that occurs outside of the classroom, but is hosted on the campus. These include seminar series, conferences, annual lectureships, symposia, student group meetings, and more. A majority of these public lectures are one-time events, though some are part of a series. Many of these public lectures are also one-session events, though others span across multiple days. It is worth noting that within a given conference there can be various public lecture formats—plenary, poster, breakout session, etc.—that may touch on one or more kinds of science. There are also differences in whether the lecturer is from the host institution or a guest from another institution or organization. In all of this diversity in the public lecture life of theological schools, some patterns emerge.

### Which Schools Offer Science Public Lectures?

Across all of the institutions in the sample, there are 97 public lectures listed. About three quarters of the total science public lectures offered are from the northeastern (27%), southern (26%), and western (25%) institutions. Schools in the midwest and Canada each comprise 11% of the science-related public lectures listed. Despite this distribution, within each region, western schools actually have larger shares of science public lectures, and northeastern and midwestern schools have smaller shares.<sup>21</sup> [SCHOOL NAME], a large freestanding Evangelical school, carries the largest share (62%) of the west’s science public lectures.

Embedded institutions are more likely to offer science-related public lectures.<sup>22</sup> This is likely because science departments of umbrella institutions offer public lectures that are open to seminary members. For example, one public lecture from [SCHOOL NAME] was sponsored by their Chemistry and Biochemistry department. Another embedded institution, [SCHOOL NAME], hosted a public lecture on “The Evolution of God’s New Creation.”

As seen in Figure 5 below, larger institutions are more likely to offer science-related public lectures. Still, a notable share (30%) of institutions with small student bodies has science-related public lectures at their schools.<sup>23</sup> Additionally, research institutions are more likely than non-research institutions to offer science-related public lectures.<sup>24</sup>

### Who Attends These Public Lectures?

Data collectors were asked to select the primary attendees of a public lecture out of four non-mutually exclusive categories, and only if they constituted at least 25% of the total in attendance. Eight percent of the science public lectures listed serve faculty participation only, 26% serve students only, and 63% serve both faculty and students. Almost half (49%) of the public lectures are reported to serve alumni, local religious leaders, and the general public.

### Science Public-Lecture Topics

Public-lecture topics were coded into 5 categories: (1) soft science, (2) hard science, (3) both, (4) non-specific general “science,” and (5) no scientific language. The most common soft science public lectures are on psychology, though there are multiple sociology and cultural anthropology public lectures as well. The most prevalent hard science public lectures in theological schools are the sciences of origins, such as evolution and cosmology; ecology and other earth sciences; and medicine and health. A majority of the public lectures listed were hard science at 56%, while 22% were soft science, 1% were both, 12% were general science, and 9% had no explicit scientific language used in the topic. This is different from courses taught at theological schools, which trended towards the soft sciences.

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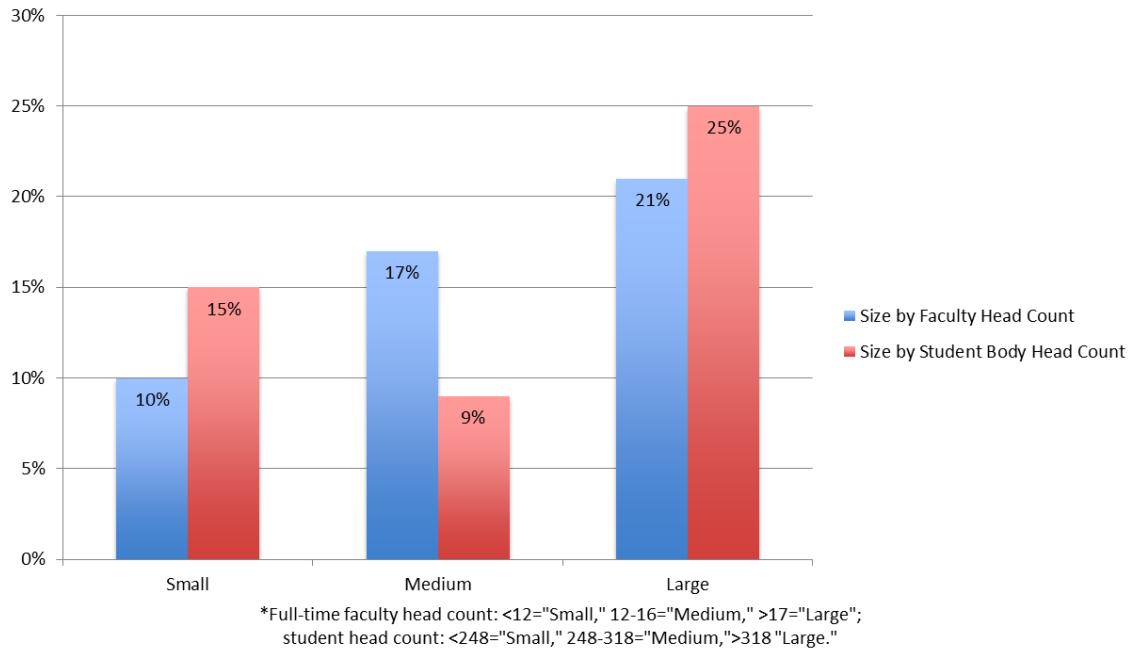
<sup>21</sup>  $P < 0.01$ .

<sup>22</sup>  $P < 0.01$ .

<sup>23</sup>  $P < 0.05$

<sup>24</sup>  $P < 0.001$ .

**Figure 5: Percent of Public Science Lectures by Size of the Faculty and Student Bodies  
(Total Number of Public Lectures = 97)**



Schools with large faculties are more likely to offer public lectures in the hard sciences and medium-sized faculty are more likely to offer public lectures in the soft.<sup>25</sup> Large student bodies are conversely associated with the soft sciences and medium-sized student bodies are more likely to offer public lectures in the hard sciences. One institution that has both a large faculty and medium student body is [SCHOOL NAME]. Consistent with these results, they demonstrate hard science usage in their medical and archaeological public lectures.

Embedded institutions are slightly more likely to favor the hard sciences in their public lectures, while freestanding institutions are contrastingly more likely to employ the soft sciences. Some hard science public lectures at embedded schools are the result of their relationships with other departments.

### **How Is Science Treated in Relationship to Theology in Public Lectures?**

Most of the public lectures in the study represent the interdisciplinary dialogue between the sciences and religion. Very rarely are the sciences treated apart from their theological or practical theological implications. One example of dialogue between science and theology occurred in a lecture series at a freestanding Mainline institution. It involved a dialogue between a father and son, one of whom holds his Ph.D. in physics and the other who holds his in theology. Another common example of dialogue revolved around the science and theology of origins. Using science for ministry was also demonstrated, particularly in one freestanding Mainline institution's president's lecture about a technique that uses neuroscience to learn sermons and lectures in order to improve preaching and teaching. The relationship between science and faith in public lectures is first dialogical, then it is used to serve ministry purposes.

### **Science Public-Lecture Schedules**

Public lectures range from one session to multiple sessions across many days and can occur frequently or infrequently. An open-ended question on how often the public lecture takes place was coded into four categories: (1) one-time event, (2) yearly, (3) multiple times throughout the year, and (4) undetermined. Whether a lecture is part of a series was not collected in the data. If the lecture's title identified it as part of a

<sup>25</sup> P<0.01.

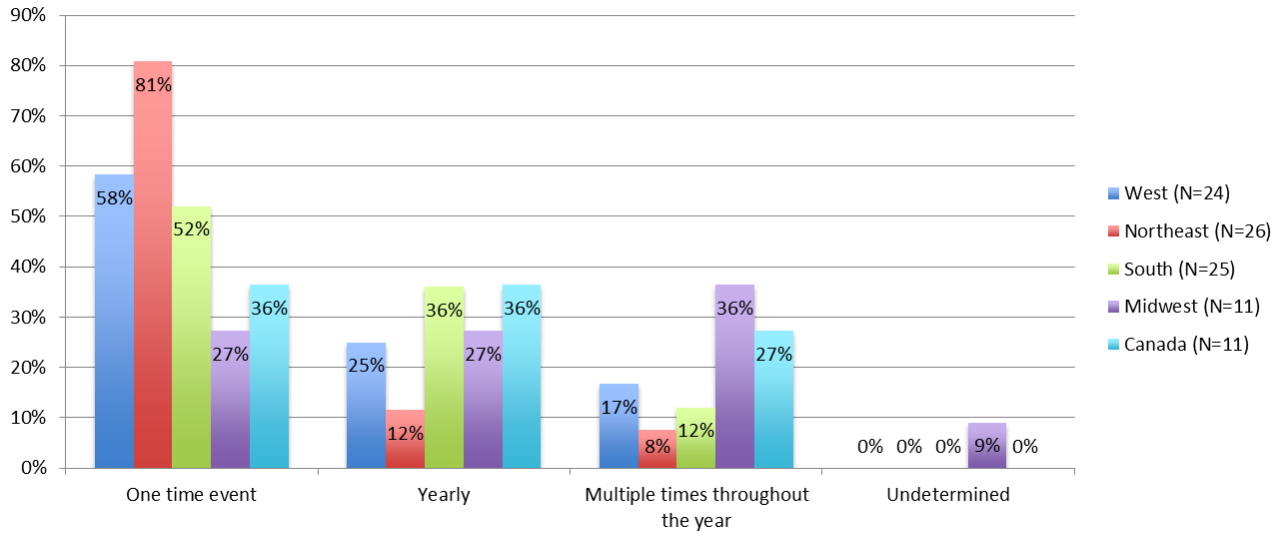
series, lectureship, annual program, etc., then it was coded as a series. If only a talk or conference title was offered, it was a one-time event.

That a science public lecture was part of a series does not mean the entire series is scientific. While there are cases where an entire series is devoted to science, there are also cases where science is simply one topic in a larger lectureship or program. An example of the former is [SCHOOL NAME], which offers a four-week continuing education lecture series that theologically reflects on mental and physical health. [SCHOOL NAME] also sponsors a public lecture series devoted entirely to archaeology. Other institutions only sometimes integrate science into their public-lecture series. This was the case with a theological lectureship at [SCHOOL NAME] that sometimes engaged science topics. Even faculty award lecture series sometimes draw out scientific themes, as was the case at [SCHOOL NAME].

Of all of the public lectures in the sample, about three in five are stand-alone or one-time events. A sizable 37% are part of a series. In terms of frequency, 26% of public lectures are offered yearly, 17% are offered multiple times throughout the year, and 1% are undetermined.

Regional location matters for how science public lectures are scheduled. As seen in Figure 6, northeastern schools are the least likely to offer science public lectures on a yearly basis or even multiple times throughout the year. Instead, they are more likely to offer them as part of a one-time event. In contrast, midwestern schools are the least likely to hold a one-time science public lecture, but instead are more likely to offer science public lectures multiple times throughout the year.<sup>26</sup> Whether a public lecture is part of a series or not also varies regionally. Canadian institutions are the most likely to host science public lectures as part of a series (82%), while large shares of northeastern (85%), western (67%), and southern (64%) institutions host stand-alone public lectures.<sup>27</sup>

Figure 6: Frequency of Public Lectures by Institutional Region



HBTS status and school size appear to matter as well, but only in the case of faculty headcount for the latter.<sup>28</sup> As the faculty headcount goes up, so does the likelihood that their science public lectures are only a one-time event. Schools with large faculty are the least likely to offer science public lectures annually. Instead, HBTS's have a strong tendency to offer science public lectures on a yearly basis.<sup>29</sup> Institutions with smaller faculty have a tendency to offer science public lectures more frequently.

<sup>26</sup> P<0.05.

<sup>27</sup> P<0.01.

<sup>28</sup> P<0.01.

<sup>29</sup> P<0.001.



## Summary

Larger, embedded research institutions in the western region are more likely to offer science-related public lectures. Unlike seminary coursework, seminary public-lecture circuits are more characterized by hard science integration. Hard science public lectures are also more likely at embedded schools, and institutions with large faculty and medium student bodies. At times, science and faith are in interdisciplinary dialogue with one another, and at other times science is used for serving practical purposes.

Midwestern schools and institutions with smaller faculty stand out for holding science public lectures multiple times throughout the year. And Canadian schools are more likely to host public lectures as part of a series.

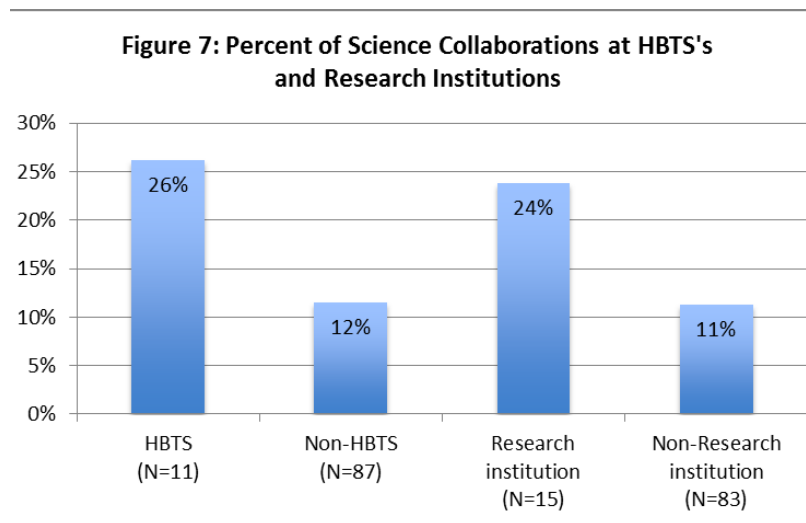
The level of science integration in this venue was not easily measured because the actual content could not be analyzed. What can be said is science public lectures appear to be the product of well-resourced seminaries. Even though smaller schools are more likely to offer science public lectures throughout the year and to wide-ranging constituencies, institutions with larger faculty and those that are embedded offer the most science lectures. They are, additionally, more likely to engage the hard sciences, which could suggest that this too is the result of having more resources, such as access to a wide range of science department lectures. Institutions with greater resources are more likely to branch out and have strong science lecturing programs.

## CHAPTER 3: COLLABORATIONS AND PARTNERSHIPS

There are a variety of science collaborations taking place at ATS seminaries. Some have already been noted, such as the connections created around coursework. Other science collaborations include partnerships created by centers and institutes, as well as special events and programming.

### The Character of Science Collaborations

There were a total of 98 collaborations named in the sample. A quarter of these (26%) came from [SCHOOL NAME], 14% from [SCHOOL NAME], 11% from [SCHOOL NAME], and 10% from [SCHOOL NAME]. Regionally, western and southern schools are more likely to report having collaborations, and midwestern schools are the least likely.<sup>30</sup> Schools with large student bodies are more likely to have a science collaboration.<sup>31</sup> Figure 7 shows that research institutions<sup>32</sup> and HBTS's<sup>33</sup> are also more likely to have science collaborations.



Textual analysis of the names of each collaboration, collaboration partner, and webpage content yielded some noteworthy results. First, center-based collaborations represent 34% of the sample, also counting granting organizations. Additionally these institutes, groups, alliances, or similarly named external and internal organizations characteristically bring together multiple universities and theological schools. One example of this is the Midwest Religion and Science Society (MRSS), which brings together several institutions from around the midwest and helps support [SCHOOL NAME]'s Conference on Religion and Science.

There are a variety of center-based science collaborations. A couple organizations were particularly devoted to environmental education and conservation work, such as [SCHOOL NAME]'s collaboration with A Rocha and [SCHOOL NAME]'s Sustainability Group. The Rotman Institute works with [SCHOOL NAME] to put on public lectures and other programming on philosophy and contemporary science. The Faith and Science Group at [SCHOOL NAME], brings together students, staff, faculty, and guests on topics related to faith and science. And the John Templeton Foundation was explicitly mentioned for how their funds helped seminaries create special programs, like summits or even a center devoted to Christianity and science.

<sup>30</sup> P<0.001.

<sup>31</sup> P<0.05.

<sup>32</sup> P<0.05.

<sup>33</sup> P<0.01.

The second type of science collaboration observed in these data are collaborations between two institutions, including joint-degree programs with neighboring or umbrella institutions. Both [SCHOOL NAME] in collaboration with its umbrella university and [SCHOOL NAME] in collaboration with the [NON-ATS SCHOOL NAME] School of Social Work offer joint MSW programs to their students—a degree program that draws from the social sciences. [SCHOOL NAME] also has some collaborative degree programs established with both [NON-ATS SCHOOL NAMES].

Due to their proportion, health-related collaborations are treated apart from center-based and institutional collaborations. Almost a third (30%) of the science-based collaborations in the data are in service to the physical or mental health of others. Collaborations dealing with physical health were often field education medical sites or special programming related to medical conditions, like HIV/AIDS. The majority of health collaborations, though, revolved around mental health. These included associations with groups offering counseling and rehabilitation services, as well as programming devoted to mental health.

Some science collaborations in the sample centered round special events or programming—7% were gatherings and 11% were programs sponsored by churches, social service organizations, or committees. Some of the events were sponsored by a variety of organizations, like the Church and Science conference held at [SCHOOL NAME], which was a concerted effort by the seminary, an institute, churches, and other organizations. As far as social service organizations go, one ministry worked with [SCHOOL NAME] to provide morning workshops with speakers certified in rehabilitation science, psychology, mental health, and addiction.

### **How Scientific Are These Collaborations and Partnerships?**

The level of explicit science integration in these collaborations was measured by the use of scientific or technical terms in (a) the title of the collaboration or partner name, as well as (b) in the content of the website of the collaboration or partnership. Fifty-six percent of the science collaborations in the sample demonstrate explicit science treatment. That leaves 44% of the total collaborations in the sample to have no explicit or weak treatment of the sciences.

Some institutions' collaborations are more explicit with science than others. For instance, western and Canadian schools have larger shares of explicitly scientific names or websites, and northeastern schools have the smallest share.<sup>34</sup> Non-research institutions also appear to be moderately more likely to offer explicitly scientific collaborations than research institutions.<sup>35</sup> Whether an institution is an HBTS also appears to matter, as non-HBTS's are significantly more likely to offer explicitly scientific collaborations.<sup>36</sup> Evangelical schools are also more likely to offer explicitly scientific collaborations, while Mainline schools are the least likely.<sup>37</sup>

Of the collaborations that have explicit science treatment, more employ the hard sciences than the soft sciences. Hard science collaborations range from biology and cosmology to archaeology and physical health concerns. Soft science treatment mostly revolves around mental health, though there was some representation of other social sciences, like sociology.

### **Collaborative Work with AAAS**

Many of the institutions (43%) in the sample are grant recipients from the American Association for the Advancement of Science (AAAS). This is part of a collaboration between the Association of Theological Schools (ATS) and the AAAS to increase science in theological schools in order to reshape the minds of religious leadership and laypeople on the importance of science for religious worldviews. AAAS' Science for Seminaries project is part of a three-year effort to help seminaries integrate science into their core curricula. This project offers a variety of initiatives, programming, and resources to attain that objective.

As a result, AAAS came up frequently in this study. They are noted for revamping the curriculum in theological schools, with a particular focus on integrating science into required courses like Systematic

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<sup>34</sup> P<0.001.

<sup>35</sup> P<0.01.

<sup>36</sup> P<0.01.

<sup>37</sup> P<0.001.

Theology. Some of AAAS's science advisors can be linked to multiple seminaries, showing that science collaborations in some cases revolve around individuals working towards advancing science. AAAS also helped revitalize the lecture circuit on seminary campuses, as some institutions, like [SCHOOL NAME] and [SCHOOL NAME], reported incorporating more science into their lectureships. They also aided in the creation of special events and programming, such as the "Hearing God's Voice in Nature" meeting at [SCHOOL NAME] in 2015.

While there are many notable examples of AAAS advancing science in seminaries, AAAS institutions do not outperform non-AAAS institutions in their treatment of science. Even though three of the four top performing institutions in science collaborations are affiliated with AAAS, non-AAAS recipients are actually equally as likely as AAAS recipients to report science collaborations. There is also no statistically significant difference between AAAS institutions and non-AAAS institutions and the amount of science public lectures schools offer.

AAAS affiliation also appears to matter little for institutional curriculum. Despite their Science for Seminaries initiative, AAAS recipients are not more likely than non-AAAS recipients to offer or require science courses as part of their curriculum, nor are they more likely to heavily integrate science. Furthermore, they are equally as likely as non-AAAS institutions to offer courses in both the soft and hard science. AAAS affiliation only really matters for how often a science course is offered: they are significantly less likely to require science courses frequently.<sup>38</sup> This could be due to the temporal limits of the grant.

## Summary

Being a western or southern school, research institution, and HBTS matters for the amount of science collaborations there are at a school of theology. Schools with large student bodies also tend to have more collaborations than others.

The two largest kinds of collaborations represented in these data are ones expedited by a center or institute, and those devoted to the health sciences.

While there appear to be early qualitative indicators of AAAS' positive relationship to seminaries and its influence on seminary engagement with science, at this point in time, there are no differences between AAAS and non-AAAS institutions, including course offerings (type, requirement, frequency, etc.) and public lectures, for example. It will be important to assess the enduring impact of the relationships several years down the line, once the program and its interventions have had a chance to mature in the schools.

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<sup>38</sup> P<0.01.

## CHAPTER 4: WEB PRESENCE

There were a total of 124 webpages represented in the sample.<sup>39</sup> While most schools only have a couple science webpages linked, [SCHOOL NAME] (11%), [SCHOOL NAME] (10%), [SCHOOL NAME] (9%), and [SCHOOL NAME] (9%) stand out for having the most. That is, of the 28 schools in the dataset, 4 make up 44% of the science webpages represented.

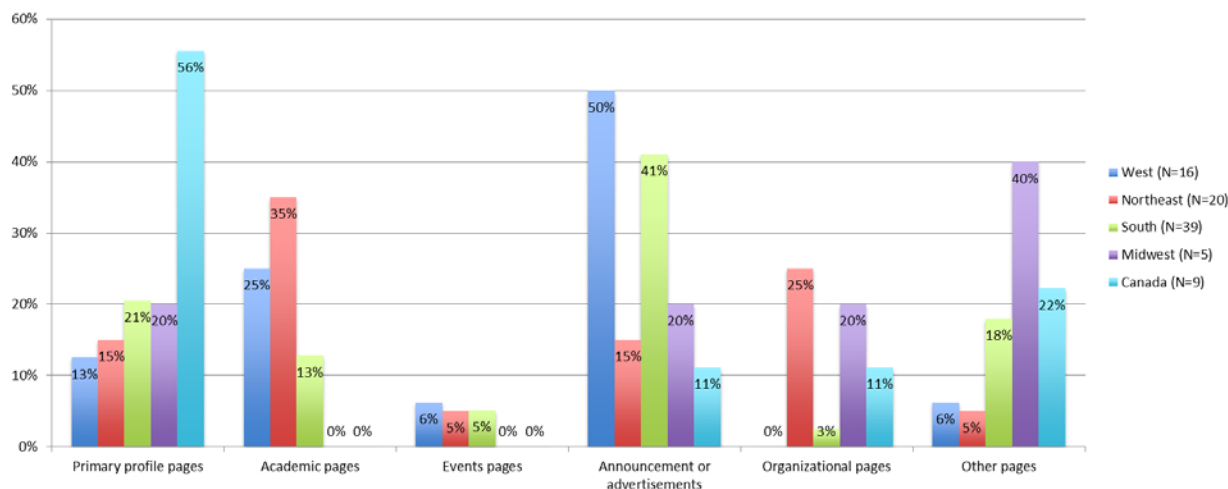
### An Overview of Seminary Science Webpages

Regionally, southern schools are more likely than others to exhibit science on their webpages, and northeastern and midwestern schools are the least likely.<sup>40</sup> Embedded schools are also more likely to offer science on their webpages.<sup>41</sup> Both research institutions<sup>42</sup> and HBTS's<sup>43</sup> are more likely than other institutions to report science on their webpages.

Seminary webpages were recoded into the following categories: (1) *primary profile pages*, which include the “about us,” “main” or “home,” “mission,” “values and commitments,” and “history” pages; (2) *academic pages*—information about degrees, admissions, and courses; (3) *events pages*; (4) *announcements or advertisements*, which include news and blog posts, articles, and pages that highlight faculty accomplishments; (5) *organizational pages*, like those describing institutes or initiatives; and (6) *other pages* include pages like an affiliation and accreditation page, student life page, grants page, jobs or internships pages, and so forth. A third (33%) of the websites posted by data collectors were of announcements and advertisements. A notable 21% of science posts occurred on a primary profile page of a seminary; 18% of the science pages were academic, 9% were organizational, 5% were of events, and 15% of the science pages were of some other type of webpage.

The only institutional characteristic that significantly matters for including science in their primary profile or other pages is geographical location. As seen in Figure 9, Canadian schools are more likely than U.S. schools to have science on their primary profile pages.<sup>44</sup> In contrast, northeastern schools are more likely to have science on their academic pages or as part of an organization page. And western and southern schools are distinguished for being more likely to have science in their announcements and advertisements.

Figure 8: Percent of Science Webpage Sections in Each Region



<sup>39</sup> Thirty-five of these webpages are excluded from the quantitative portions of this report because they were not uploaded directly into the data questionnaire. However, they are included in all qualitative analyses.

<sup>40</sup>  $P < 0.001$ .

<sup>41</sup>  $P < 0.01$ .

<sup>42</sup>  $P < 0.001$ .

<sup>43</sup>  $P < 0.1$ .

<sup>44</sup>  $P < 0.05$ .

## **An In-Depth Look at Each Type of Webpage**

In the following, attention will be given to specific examples of the kinds of webpages that emerged in the data and what they indicate about how science matters to theological schools. Please note, it is difficult to assess the degree or level of science integration for comparative purposes across webpages because the pages are so different. The presence of science in course catalog search results, for example, is very different from a blog devoted to the topic, which is also different from the mention of science in a professor's biography page or an advertisement on a play about Darwin.

### ***Primary Profile Pages***

Eleven percent of webpages listed were of an institution's primary profile page. For example, [SCHOOL NAME]'s mission statement includes a statement about attending to God's creation, and they also state that one of their goals is to learn from science as well as critique it. [SCHOOL NAME] also has psychology represented in all of their "About" [SCHOOL NAME] pages because they have a School of Psychology; furthermore, one of their explicit institutional goals is to integrate the social sciences into theology. Along these lines, under their "About" tab, [SCHOOL NAME] describes how they rate their educational effectiveness and one of the measures is multidisciplinary dialogue, which includes explicit mention of the social sciences. Some institutions incorporate science into their identities, but these tend to be in favor of the soft sciences.

Other cases of science on an institution's primary profile page are not as integrated with the institution's formal academic identity. For example, [SCHOOL NAME], in their "About Us" page, mentions that one of their buildings is LEED Certified and that they are one of the greenest seminary campuses. [SCHOOL NAME] had an institutional timeline on their history page, which specifies the establishment of an elementary medical science class. There were no mentions of science on seminary front pages during the data collection period.

### ***Academic Pages***

Academic pages include information about degree or certification programs. [SCHOOL NAMES] each had information about some of their science degrees. Some seminaries had webpages devoted to certifications, like Clinical Pastoral Education and other health-related credentialing.

Other academic webpages featured course-relevant information. For example, some institutions, like [SCHOOL NAME], have an online catalog search engine that reveals topical search results, such as an institution's hard and soft science course offerings. Other schools featured special course pages on their websites. [SCHOOL NAME] had multiple special courses listed, like their Israel travel course that involves Zeitah Excavations.

### ***Events Pages***

Most of the events pages on seminary websites are about public lectures or conferences, though with some variability. As was found with the public-lecture circuit earlier, these are much more hard science events than soft. Hard science topics include ecology, climate change, plants, chemistry, neuroethics, cosmology, medicine, and archaeology. Many of these events represent an explicit dialogue between religion and science. Some examples of webpage events are the Church and Science conference hosted by [SCHOOL NAME]; the AAAS sponsored lecture on "Social Diagnostics amidst Ecological Destruction" at [SCHOOL NAME]; the archaeology lectures at [SCHOOL NAME]; and "Mr. Darwin's Tree," which is a play visiting [SCHOOL NAME] among other institutions. Event pages also varied in the level of science engagement, with some having only one session devoted to science and others having the entire program revolving around science.

### ***Announcements & Advertisements***

Most of the announcements and advertisements on theology school webpages are faculty-related. Examples include the hiring of a new biology professor who integrates science and faith in the classroom, a

job posting for a professor in environmental studies, and faculty biography and publication pages that capture some science in their previous or current work. There were also several news posts that mentioned science to varying degrees, such as the two institutions that mentioned the deaths of trustee members who had science backgrounds. There was also a blog post about a field trip to the Kennedy Space Center.

### ***Organizational Pages***

Organizational pages include a variety of science campus-serving organizations. For example, [SCHOOL NAME] and [SCHOOL NAME] are some examples of schools with Health and Wellness offices or initiatives that serve the physical and mental health of institutional members. Some student organization webpages are devoted to environmental justice, like Shaping Attention to God's Earth (SAGE) at [SCHOOL NAME]. There are also a couple museum and other center pages devoted to the archaeology of the biblical world. Also listed under organizational pages is the work done under "Intersections: Science and the Church" at [SCHOOL NAME], which came up a few times at other institutions for putting on programming devoted to the integration of science and Christianity.

### ***Other Pages***

Most of the pages coded as "other" pages in the data relate to special grants, jobs and internships pages. All grants pages were from AAAS. Items featured on their AAAS partnership page include a blog, news about how "Science for Seminaries" is revamping the curriculum, and an announcement on how the grant has enhanced two joint-degree programs between the divinity school and university at [SCHOOL NAME]. Job and internships pages connected students and graduates with various science-related work opportunities, such as health service organizations.

### **Summary**

Southern schools are more likely to offer science webpage links. They are additionally more likely to feature science on their announcements or advertisements pages. Northeastern schools, in contrast, represent larger shares of academic and organizational pages.

While a few institutions stand out for demonstrating the importance of science to their larger institutional project on their primary profile pages, almost every other school treats science with secondary importance. While science is integrated into the academic pages of several institutions, it really only shows up on announcement and advertisement pages as an understated detail. While some of the events, organizational, and other pages draw attention to some of the science work being done on campuses, they are not linked on the website in way as to indicate institutional priorities. As of now, science is only peppered on the websites of theology schools.

## CONCLUSION

This report provides a snapshot into how science is engaged in schools of theology across four venues: courses, lectureships, collaborations, and websites. Particular attention was given to the institutional characteristics that shape and reshape how seminaries approach the sciences. This analysis lends the opportunity to learn from the best and to determine the most appropriate approaches for schools in each institutional category. If research institutions are particularly successful with offering science-related degrees, as this study found, then they are worth a closer look to learn how other institutions might similarly incorporate science into degree tracks. Furthermore, knowing what venues and aspects of venues institutions are strong and weak in can improve intervention strategies. That embedded institutions are stronger in offering hard science lectures can be improved upon by either reinforcing hard science events or exploring the incorporation of soft science alternatives. Indeed, the goals of this study were not only to better understand how science is treated in seminaries but also to help identify “low hanging fruit.” To that end, this conclusion offers five low hanging fruit.

- 1) *Refer to science explicitly.* In many cases, the level of science integration could have been increased if the document or webpage used explicitly scientific language. Recall that 15% of courses and 44% of the collaborations (their names and webpages) had no explicit evidence of science engagement. Adding scientific or technical jargon in these areas is one way to bolster science presence and expose religious leaders to more science. Seminary courses can especially benefit from this. For example, one course at [SCHOOL NAME] that showed no evidence of science engagement was called “Biblical Interpretation and Social Experience.” This course could easily refer to just a few scientific factors that shape individual experience—like socioeconomic status, genetics, and ethnocentrism—which in turn can also influence biblical interpretation.
- 2) *Enhance current efforts.* In general, theology appears to have a proclivity towards soft science, specifically the mental health sciences. This is demonstrated in the courses offered, the kinds of soft science lectures conducted, and the therapy and counseling collaborations and webpages. This affinity for the psychological sciences could be an opportunity for hard science integration, though. For instance, [SCHOOL NAME], an institution that is comprehensively strong in psychology, can build on their current efforts with an adjacent hard science, like neuroscience or neurobiology. This would add hard science to an institution that is already proficient in a social science, which would expand science exposure.
- 3) *The topic of origins of the universe and ecology.* Another way to expand hard-science exposure is to better integrate those hard sciences that are already compatible with theology. By far, the most frequently cited hard-science course or lecture had to do with putting science and theology in conversations over cosmology and the environment. Often, even the general mentions of “science” appeared to imply exploring things like evolution, biology, and physics. For centuries, theologians have asked questions related to existence, and many of these hard sciences seek to understand and explain those questions. At the very least, this dialogue can be incorporated into systematic theology courses, Old Testament courses, and church history.
- 4) *Incorporate scientific assignments.* Dozens of courses in the sample offered characteristically scientific assignments. This includes conducting interviews, ethnography, and case study research. These assignments demonstrated how compatible some scientific methods are with theology. Thus, some professors can bolster their use of science by assigning students to visit a church, for example, or other site and record their observations in an analytical report. This can even be reinforced by having them explore scientific theory for explanations for the phenomena they witnessed. Even more, a short reading on how to conduct such field research could not only expose students to empirical methods, but challenge them to think scientifically (e.g. hypothesis testing) and in terms of evidence.
- 5) *Integration of experts.* Time and again the importance of science experts made the difference for the level of science integration in seminary venues. Science experts served as co-teachers or guest lecturers in seminary courses. They visited institutions as guest speakers in their conference or



lecture circuits. And they were key components in some collaborations—AAAS, for example, had science advisors that could be linked across ATS seminaries. All this is in addition to the importance of full-time faculty with science specializations. Such faculty often taught the bulk of the science courses offered at an institution. Individuals are important to enhancing the sciences in seminaries. Whether modifying hiring practices to deliberately procure individuals with science backgrounds or tapping into science networks, attempts to draw from science experts are well worth the effort.

### **Final Discussion**

This study shows that there are many ways and to varying degrees science is represented in seminaries. From being peppered across institution webpages, to being part of a course's weekly discussion, science exposure in seminaries crosses many levels of analysis. If science is to take its place as an important dialogue partner with theology, then intentional effort is needed. This includes changing the language used to be more science-explicit, exploring opportunities to build on institutional strengths with the hard or soft sciences, incorporating scientific methodologies into ministry practices, and bringing in experts to compensate for science deficits.

In the past, the faithful were leading in scientific discovery. And today theology and science are asking many of the same questions—they are both seeking truth, whether it is singular or manifold. Both disciplines have much to offer each other. Science can reframe the theological conversation, making it more accessible to others and allowing theology to explore even further beyond the roadblocks of the discipline. Theology can shape scientific inquiry to explore evidence of how God might be working in creation, and that includes in natural and social ecology. Furthermore, with an increased interest in the entwined relationship between science and religion comes a better future. Only by understanding what scientific evidence shows us about social and planetary problems can efforts at solutions become more effective in obviating or assuaging these issues.