A Faith and Technology Resource Hub: Building the Christian Engineer's Bookshelf

Gayle Ermer *Derek Schuurman*

Calvin University *Calvin University*

ABSTRACT

A wealth of material related to the interactions between faith and technology has been generated over time to help Christian engineers reflect on and evaluate their work and technology development more generally. However, there is currently no central location where this large variety of resources can easily be accessed. This paper will describe the process of developing a faith and technology resource hub. The vision for the hub is that it will include a comprehensive searchable directory of resources addressing faith and technology, as well as a browsable, organized, curated, and annotated set of webpages containing links to particularly important and relevant references. This could be viewed as a continuation of work that was presented in a panel session at the 2009 Christian Engineering Conference titled "The Christian Engineer's Bookshelf." This panel was an initial attempt at identifying a set of foundational resources that Christians involved in technology could consult to bring their faith to bear on their work. The paper will include a review of other organizations and websites that offer repositories or collections related to this subject. It will provide details about the processes used to gather citations, with Zotero as the backbone for source gathering and organization. It will describe the prototype website format and capabilities, as well as presenting a set of questions that will be used to obtain feedback from conference participants. This work is funded by a grant from the Calvin Center for Christian Scholarship.

INTRODUCTION

A wealth of material related to the interactions between faith and technology has been generated over time to help Christian engineers reflect on and evaluate their work and technology development more generally. This work ranges from highly scholarly (e.g. published in peer-reviewed journals) to highly popular (e.g. in blogs or podcasts directed at the general public). However, there is currently no central location where this large variety of resources can easily be accessed. A scholar who wishes to build on previous work may struggle using typical academic search databases to identify resources with direct relevance. Christian perspectival reflection on technology and engineering spans multiple disciplines, typically outside of the literature of technical engineering. Reflection on faith and technology often occurs in the disciplinary resources related to philosophy, social sciences, and religion/theology. Professional engineers who wish to enter this conversation may not know where to start looking for thoughtful work in this area.

This paper will describe the process of attempting to address these needs through the development of an online faith and technology resource hub. Why have we chosen to describe this as a "hub"? We envision this resource as a centralized platform where the many spokes of discourse related to faith and technology are brought together, linking disparate disciplines. Ideally this will be a permanent website. The hope is that it will enable collection of thinking from the past, making older resources findable to counter the

tendency in our digital era to focus only on what is only available electronically. It would also be updated regularly to capture responses to contemporary technological innovations.

We considered calling our site a "repository," however we do not envision this primarily as a place to provide storage of documents or other resources. The focus will be on providing access to resources that are hosted elsewhere (although we hope to incorporate electronic document copies where possible). We also considered calling it a "database." While this would be a technically correct description, the database title would not reflect the curated bookshelf aspects of the project.

PROJECT VISION

The vision for the hub is that it will include a comprehensive searchable directory of resources addressing faith and technology, as well as a browsable organized, curated, and annotated set of webpages containing links to particularly important and relevant references. The primary audience is anticipated to be Christian engineering scholars, who want to build their work on a solid foundation and interact with diverse viewpoints, but we also hope the resources will be useful for practicing engineers and policymakers.

In the interest of transparency, it is important to note that the authors approach the project of integrating faith and technology from a Reformed Christian perspective. This approach encourages the development of a distinctively Christian view on how technology should be designed and deployed. This approach also recognizes the implications of the doctrine of "common grace," i.e. that perspectives from secular scholars and other religions can and should also be incorporated into the efforts to do technology responsibly.

Searchable Directory

The faith and tech hub will be organized into two primary sections, each with its own use cases. The first consists of a comprehensive searchable database of citations related to an understanding of the relationship between faith and technology/engineering. This database will be an alternative to current databases available for literature searches that focus on specific disciplines. As an example, the Hekman Library at Calvin University lists 245 available databases. It is not obvious which of these might be effective for finding work related to faith and tech. Disciplinary engineering databases (e.g. The ACM Digital Library including publications of the Association for Computing Machinery), which technical professionals and scholars might be most familiar with, focus primarily on technical topics and only rarely include philosophy or faith-based reflections. Papers that include this kind of reflection are more likely to be included in databases related to the humanities (contextual disciplines). Databases for the contextual disciplines do not typically incorporate faith perspectives. Some contextual disciplines have societies that approach topics from Christian or faith-based perspectives (e.g. the Society of Christian Philosophers), but those groups are quite small and do not maintain their own databases. We hope that our bibliographical database will be a "one stop shop" for focusing on faith and technology. Our primary goal is to provide citations. This would direct users to books and journal articles that might not be available digitally or in the public domain. A secondary goal is to provide URLs for resources that are available online. The final goal is to provide a pdf copy of the resource directly in the database for download (when available). The intent is to include materials in a wide range of media (e.g. blog posts, podcasts, and video recordings, along with books and articles).

Currently, the most likely places to find scholarly resources in this area (at least in the United States) would be through the Christian Engineering Society (CES), the Association of Christians in the Mathematical Sciences (ACMS), and the American Scientific Affiliation (ASA). Both CES and ACMS have publication archives available on their websites, with entire proceedings or journal issues bundled in single pdf documents. This makes it difficult to locate individual papers. ACMS provides a search feature via a website hosted by the Taylor University Pillars database [1]. CES [2] has recently started to address this issue by uploading individual papers to the Cedarville University Commons. David Dittenber, a previous CES conference program chair, has completed this task for papers from the 2017 and 2024 conferences. The ASA website [3] includes the ability to search all publications using keywords.

In the construction of a new database, the main consideration is what to include (and what to exclude). The set of resources related to the intersection of faith and technology is hard to bound, since technology touches nearly every aspect of lived experience. Normative understanding of technology means that many academic disciplines could be relevant in technology evaluation. Not bounding the set closely enough could make searches less efficient and useful (i.e. too much clutter). But bounding the set too closely could mean leaving out items that might be relevant or interesting to users. In general, our goal is to err on the side of loose bounding. We will exclude resources that are purely technical (without any reference to faith-based values or context) and exclude resources written from a faith-based viewpoint that do address technology-related activities. However, there may be good reasons to include Christian approaches to what makes us human or how to understand the natural world, even if those resources are not directed specifically at engineering or technology development.

For the initial stages of this project, the decisions on what to include were framed by the extent to which particular resources contribute to answering two central questions: 1) how does Christian faith apply to evaluating technology development and/or promoting responsible engineering design? and 2) how does engineering and/or technology deepen or broaden our understanding of living out our Christian faith?

Christian Engineer's Bookshelf

The second part of the hub will consist of one or more curated and annotated sets of resources that would be valuable as starting points for engineers interested in exploring the intersection of faith and technology. The first set addressed in this project is a "Christian Engineer's Bookshelf" including ten influential books that the authors believe are foundational to the understanding of engineering and technology from a Christian perspective. This collection will address foundational questions about the nature of technology (philosophy of technology), the nature of engineering, and the application of Christian values and ethical frameworks in guiding technological development.

Project Goals

Among all of the possible features of the envisioned hub resource, the project reported on in this paper focused on the development of a prototype website to illustrate the value of such a resource. The prototype will include:

A searchable database of citations related to faith and engineering, capturing (at a minimum) those published by the Christian Engineering Society (CES), American Scientific Affiliation (ASA), and the Association for Christians in the Mathematical Sciences (ACMS)
A list of 10 books providing a foundational understanding of technology for use by Christian engineers with short descriptions

HISTORY AND CONTEXT

This work is a continuation of thinking that was presented in a panel session at the 2009 Christian Engineering Education Conference titled "The Christian Engineer's Bookshelf." This panel was an initial attempt at identifying a set of foundational resources that Christians involved in technology could consult to bring their faith to bear on their work. Participants in that panel included Gayle Ermer, Steven Frezza, Paige Gibbs, and Nolan van Gaalen. Unfortunately, since this idea was presented as a panel rather than in a published paper, the results of the discussion were not disseminated via conference proceedings. The list of book suggestions that was presented in the original panel session PowerPoint slide deck is included in the appendix of this paper for reference. The panel identified the following specifications for the bookshelf: 1) that it be reasonable in size (~10-20 resources), 2) that it reflect a group effort, 3) that it represent a range of perspectives, 4) that it cover the most important topics, and 5) that it describe as well as list the chosen books. Although an intention was expressed during the panel to collect additional suggestions and come back to the 2011 CEEC with an annotated list, that did not end up happening.

PROCESS AND PROGRESS

The work of assembling citations can be tedious and time-consuming, regardless of the database platform chosen. The first iteration of a web-based interface for database management involved using a WordPress site with capability of manually entering citation data. Staff from the Christian Classics Ethereal Library (CCEL) [4] provided consultation and web development support for the protype site. This allowed for both browse and search functions. The primary downside of this approach was the difficulty of recording and entering citations. The interface was also somewhat clunky and with limited display options.

During the course of the project, we became aware of the ongoing work of Calvin Jongsma from Dordt University [5] in assembling a bibliography of resources related to faith and mathematics. Cal reported that he was using Zotero as the backbone for his source gathering and organization. Cal graciously shared his draft library in Zotero with us. It became clear after attending a Zotero training session that capturing citations in Zotero using the browser plugin provides a substantial time savings over entering citations by hand. Zotero also allowed for inclusion of URLs and uploading of documents associated with citations. The Zotero application on its own does not provide the most desirable interface for searching. It was decided that linking Zotero functionality into the website, either using WordPress with the Zotpress plugin or using the Zotero Web Application Programming Interface (API) with a web frontend, would provide the best of both worlds in terms of a public-facing web presence.

Search Process for Building the Database

The collection of relevant resources began with review of the books on our office shelves. The process of adding these books to the database was facilitated by the capability in the Zotero interface for typing in an ISBN number to capture book title and all other associated citation information. The Zotero browser plugin can also capture this information from an amazon.com book page.

The next step consisted of collecting paper citations from all CES-related conference proceedings. These included Christian Engineering Education Conferences (1999-2011) and Christian Engineering Conferences (2012-2024). The presumption was that every paper from these conferences would be relevant, since the CES has always required that each submission include considerations of Christian faith and technology/engineering. The capture of individual citations presented a challenge, since the CES

conference proceedings are hosted on the website in the form of a single pdf for each conference. For the 2019 and 2024 conferences, individual papers have been published on the Cedarville University Digital Commons [4]. Importing these citations into Zotero was straightforward. After using the Cedarville Digital Commons search functions to locate all articles associated with the CES, each article's citation data was captured using the Zotero web browser plugin.

However, the remainder of the CES conference papers have not been disaggregated. Rather than manually adding each citation based on a review of the table of contents for each proceedings document, the AI capabilities of Microsoft Copilot were used to capture citation information from each pdf file in an appropriate format (bibtex) that could then be uploaded in a batch mode to Zotero. After some trial and error in generating an effective prompt, this process was quite effective, although the same prompt with instructions in Copilot led to slightly different results in analyzing each document. The varying format and organization of papers within each pdf appeared to impact the ability of the AI to capture and organize information consistently. Manual review of citation fields within the Zotero library after importing was necessary to add fields that were missed (e.g. page ranges) or to correct errors (e.g. AI did not always parse first and last names correctly when a last name included a space). In some cases, Copilot was able to capture paper abstracts from the proceedings documents and add them in the citation. In other cases, Copilot could not capture the abstract completely. In those cases, abstract text was cut and pasted manually. AI was also used to generate abstracts for papers where an abstract was not included. A total of 208 CES-related papers were added to the Zotero library and tagged as "Christian Engineering."

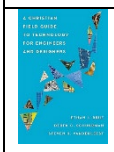
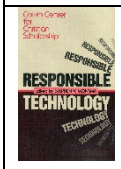
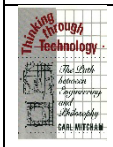
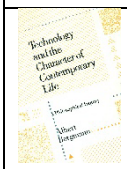
The next step was to incorporate ASA resources (primarily *Perspectives on Science and Christian Faith* journal papers) related to engineering and technology into the library. The ASA, as reflected in its flagship journal, focuses primarily on the intersection of faith and science. Although science and technology are clearly related, they are not the same. An affiliate group within ASA, the Christian Engineers & Scientists in Tech (CEST), has sponsored sessions at ASA conferences and contributed articles to the journal for many years. To find those papers, ASA website database searches were performed using the keywords "engineering" and "technology." Of the hits on these topics, articles related to creation care were not included unless there was a technological rather than scientific focus. Also, articles related to genetic engineering and bioethics were not included at this time (since those also tend to focus on science rather than technology). A similar search was performed on ACMS publications using the Pillars database. *Christian Scholars Review* publications (both the journal and blog entries) were searched, as well as *Christianity Today* magazine. Citations from some other technology and faith resource websites were captured as well. Those included the CES "Resources/Books and Articles" page [7] and the reference page from the companion website for *A Christian Field Guide to Technology for Engineers and Designers* [8].

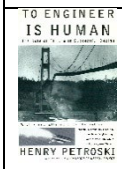
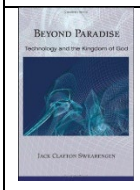
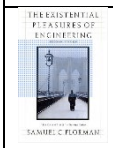
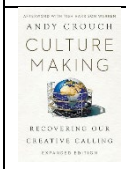
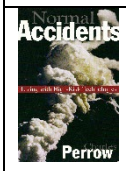
The next step was to engage with journals in the field of philosophy of technology. Only one journal was identified that referenced both technology and faith: the *Journal of Technology, Theology, & Religion* (2010-2012). Secular journals related to philosophy of technology included: *Philosophy & Technology*, *Techne* (Society for Philosophy and Technology US), and *Technophany*: a journal for Philosophy and Technology. By searching standard library databases and individual journal websites using the keywords "faith" and "Christianity" and browsing some older paper editions, I was able to identify a dozen or so articles of interest.

Finally, a search of Amazon.com for “theology” and “technology” yielded additional book references. Typing “faith and technology” into google scholar yielded some additional citations, although at this point, many were duplicates of those already included in the library. This exploration also yielded a list of publications and organizations that could be searched in the future. At the writing of this paper, the Zotero group library includes ~750 entries in formats including books, journal papers, magazine articles, video recordings, blog posts, and podcasts.

Christian Engineer’s Bookshelf Process

As noted earlier, the 2009 panel session was used as a starting point. The resources on this list were reviewed with the goal of providing a list of 10 foundational resources on the hub static resources page. This was a difficult exercise. Each of the books listed in the appendix are valuable and relate to engineering and/or technology through distinctive lenses. The final choices and descriptions are included below, in a similar format to what the website will look like.

E. Brue, D. Schuurman, and S. VanderLeest, ***A Christian Field Guide to Technology for Engineers and Designers***, Chicago, IL: Intervarsity Press, 2024.	
	This recent book provides wisdom and practical guidance for Christians studying and working in engineering, computer science, technical design, and related fields. It is a must-read introduction to reflecting carefully on engineering work from a Christian perspective.
S. V. Monsma, Ed., ***Responsible Technology: A Christian Perspective***, Grand Rapids, MI: Eerdman’s, 1986.	
	This academic resource provides a foundation for developing a distinctively Christian on the influential role technology plays in our culture. A heavy read, but worth it for its interdisciplinary perspective and application to engineering design (particularly chapter 9, which introduces design norms).
C. Mitcham, ***Thinking Through Technology: The Path between Engineering and Philosophy***, Chicago, IL: University of Chicago Press, 1994.	
	This academic treatise is one of the few that addresses technology and engineering from a philosophical perspective. The holistic definitions of technology and engineering presented here are particularly insightful. His work is both abstract and practical. Although not written from an explicitly Christian perspective, the concepts are consistent with a Christian approach.
A. Borgmann, ***Technology and the Character of Contemporary Life: A Philosophical Inquiry***, Chicago, IL: University of Chicago Press, 1984.	
	In this scholarly work, the author uses philosophical and social analysis to identify patterns in technology development that induce negative influence on human flourishing. He suggests making room for “focal things” to prevent the “device paradigm” from having undue influence over our actions and relationships. Although written for a secular audience, the author’s Christian convictions are revealed in later publications.

H. Petroski, ***To Engineer Is Human: The Role of Failure in Successful Design***, New York: Vintage Books, 1992.	
	This book is one of the most entertaining and well-written attempts to describe the nature of engineering practice. The examples illustrate how the drive to optimize for better performance naturally leads to situations where current analysis models fail to anticipate edge effects that can lead to disasters.
J. Swearengen, ***Beyond Paradise: Technology and the Kingdom of God***, Eugene, OR: Wipf & Stock, 2007.	
	This book is an attempt to bring the resources of Scripture and the Christian tradition to bear on that evaluation of modern technological development. It aims to lay out a theology of technology that can help to assess the impacts of technology and steer it towards ends that are consistent with God's purposes. While not a comprehensive analysis, it does prophetically point out the challenges generated by modern society's often uncritical acceptance of the progress promised by science and technology.
E. Schuurman, ***Technology and the Future: A Philosophical Challenge***, Toronto, ON: Wedge Publishing Foundation, 1980.	
	In this book, the author describes several secular approaches to technology before contrasting them with his own Christian approach. It is helpful to see the range of philosophical stances towards technology that are possible, along with a Christian critique. The treatment of technology is more abstract than practical.
S. Florman, ***The Existential Pleasures of Engineering***, New York: St. Martin's Griffin, 1996.	
	This book (along with The Civilized Engineer and The Introspective Engineer) is intended to promote and describe engineering to the broader public. It celebrates technological progress and expresses enthusiasm for creativity and innovation. It provides motivation and encouragement for engineering work.
A. Crouch, ***Culture-Making: Recovering Our Creative Calling***, Chicago, IL: Intervarsity Press, 2008.	
	Although not focused directly on technology or engineering, this popular book provides encouragement for Christians to engage in the creative production of cultural artifacts (in addition to the critique of culture that comes more easily when we reflect on what we observe around us). The cultural mandate of Genesis is used as a rationale and the conclusions can be extended to technological creativity as well as cultural creativity.
C. Perrow, ***Normal Accidents: Living with High-Risk Technologies***, Princeton, NJ: Princeton University Press, 1999.	
	This book is particularly valuable in identifying the risks that need to managed in increasingly complex technological systems. He focuses not just on what conventional engineering approaches to safety might be helpful, but also on the societal responses that will be necessary to reduce the risk of catastrophe. Descriptions of accidents are used to highlight new challenges and inform the recommendations for dealing with them.

The prototype website can be accessed using this URL: https://faithtechhub.calvin.edu/.

FUTURE WORK

This project successfully initiated a web-presence for faith and technology resources. We hope that it can be expanded in the future. The work was funded by a grant from the Calvin Center for Christian Scholarship as part of larger project (including an edited volume and major conference on the topic of AI and faith) conceived of as preparation for the establishment of a Center for Faith and Technology. Funding is still being sought to support that endeavor.

As with most non-profit websites, it will be critical to recruit caretakers who will be responsible for adding entries and updating the website, as well as support for site hosting and software development. The investigations undertaken for the project reviewed several websites that are clearly no longer being maintained or updated. The authors of this paper plan to be the site managers for the faith and tech hub for the near future. Eventually we would like to find additional partners to review site contents and collaborate in expanding the collection.

Specific tasks that still need to be undertaken include the following.

- Reviewing current database entries for accuracy (particularly abstracts)
- Planning for the use of tags in classifying entries
- Expanding the number of entries
    - By searching with "AI" and "computing" as keywords
    - By searching in venues not yet addressed in this paper
    - By extending beyond primarily protestant Christian faith perspectives to include Catholic Christian faith perspectives
    - By extending beyond the United States to include global perspectives
- Adding links to connect books with book reviews
- Developing a ranking system for resources based on popularity of resources
- Making the Zotero database (read-only) directly available to researchers for importing citations into their own work

Some questions for which feedback is needed from the community of Christian technologists as the hub is extended include: 1) what criteria should be used to define the boundaries of the database citations, 2) what criteria should be used to judge quality of resources and decisions to add items to the "best of" lists, and 3) what kind of governance structure would be appropriate to ensure that the hub can continue to provide high-quality and unbiased information for use by Christian technologists and educators.

REFERENCES

[1] Association of Christians in the Mathematical Science (ACMS) searchable database (https://pillars.taylor.edu/acms/).

[2] Christian Engineering Society (CES) conference proceedings webpage (https://www.christianengineering.org/publications/conference-proceedings).

[3] American Scientific Affiliation (ASA) publications search page (https://network.asa3.org/page/PSCF?).

[4] Christian Classics Ethereal Library (CCEL) website (https://www.ccel.org/).

[5] C. Jongsma, “Bibliography of Christianity and mathematics update,” *ACMS Conference Proceedings 2024*, May 1, 2025 (https://pillars.taylor.edu/cgi/viewcontent.cgi?article=1025&context=acms-2024)

[6] Cedarville Digital Commons (https://digitalcommons.cedarville.edu/).

[7] Christian Engineering Society (CES) “Relevant Books and Articles” webpage (https://www.christianengineering.org/resources-career/resources-books-articles)

[8] *A Christian Field Guide to Technology for Engineers and Designers* reference webpage (https://cs.calvin.edu/activities/books/fieldguide/references.html)