

2020 McGregor proposals for students

Faculty Name	Dept.	Project Title	Project Abstract
1. Ceballos-Zapata, Abraham	Spanish	Future Visions in Language Pedagogy: Conversations on Artificial Intelligence between Language Educators and Computer Scientists	<p>Computer systems are improving in their capacity to perform tasks that involve human language, such as speech recognition and translation between languages. Those changes bring up important questions and possibilities for language pedagogy: How might language education change as computers get better at understanding language? Could new technical capabilities enable new pedagogical tools? What kinds of linguistic competence could we design these tools to support? And how might the role of the instructor shift as these tools become available? These questions move between the fields of Artificial Intelligence and language pedagogy.</p> <p>Tools and pedagogy for Computer-Assisted Language Learning (CALL) and Technology-Enhanced Language Learning (TELL) have generally been welcomed by language educators, but the difficulty of computationally understanding language has limited the scope of these tools to supporting a limited range of linguistic proficiency. For example, software like Duolingo or Rosetta Stone use Direct Method instruction, which does not require the computer to understand language. And cloze (fill-in-the-blank) tests are ubiquitous in online learning platforms because the computer can simply check whether the student's answer matches a reference. These sorts of discrete activities tend to work well to teach how to use language in a transactional way (like asking for directions), but are less helpful in teaching how to use language in an interactional way (like having a dinner conversation). In other words, these systems embed the value that it's more useful to learn how to order a meal than to converse with the person you're eating with.</p> <p>In recent years, Artificial Intelligence (AI) methods of understanding and generating text have been advancing rapidly due to the availability of large amounts of data (corpora) and computational power as well as new mathematical modeling approaches like Deep Neural Networks. These tools have already enabled new kinds of experiences with language, such as translating between languages in real time in a conversation. With highly-resourced companies and research organizations deeply invested in these technologies, the pace of improvement is likely to continue. Such rapid improvements seem to suggest that CALL's complementary role in language teaching and learning might evolve closer to the type of conditions created by language teachers or real life situations.</p> <p>Our research program asks the following questions: how might these advances in computer understanding of human language improve computer-assisted language learning? For example, could these methods support new kinds of in-class activities or generate new types of interaction for online activities? Could AI perform proficiency-based assessment or give instructors instant feedback about their own teaching? Could AI assess students' abilities and provide critical input to teachers seeking to provide comprehensible input to each individual's zone of proximal development? Overall, what new pedagogies become possible when computers can understand language?</p> <p>Our research program will put students who are pursuing careers in language education and data sciences in conversation around a strand of research that is quickly changing. Those interactions will model ways students and professors (Abraham Ceballos-Zapata and Ken Arnold) can produce interdisciplinary research across the Science and the Humanities. Our discussions will explore AI's potential to contribute to ongoing conversations regarding contemporary issues in language education such as education of immigrant communities, fostering multilingual ecologies, multilingual language assessment and language revitalization.</p>
2. den Dulk, Kevin and Van Horn, Jason	Political Science	Restorative Justice for Returning Citizens: A Mapping Project	<p>Men and women returning from prison have a range of immediate and long-term needs, from employment to housing. But the information about service providers who are friendly to returning citizens is often fragmented and difficult to find. The Henry Institute, in partnership with Calvin's Geography Department and with support from the Michigan Department of Corrections, is addressing that problem by mapping services at a county level in the state of Michigan.</p> <p>So far we have gathered data on a half-dozen counties in the state of Michigan. The map is publicly available in beta form at http://gis.calvin.edu/rc. Families, service providers, parole officers, government agencies, and returning citizens themselves are already actively using it. To our knowledge, the map is the first of its kind in Michigan, and perhaps nationwide.</p> <p>The project is ongoing as we expand the map to new counties and use the underlying data on providers to identify and explain service deserts. We hope to cover most of the state of Michigan within a few years, largely with the help of a cadre of student researchers who gather data on services, help engage potential map users, and refine the map interface.</p>
3. Johnson, Kristine	English	Writer Identity in Transition	<p>When first-year students enroll in first-year writing courses, they are often asked to write and talk about themselves as writers. By developing self-awareness about their writing practices and beliefs about writing, writing scholars believe, students will become more effective writers. Yet what if students do not identify as writers? What if writer identity is not an important element of a student's identity? The goals of this project are to understand how strongly high school seniors identify as writers and to determine if—and in what ways—that identity persists during the first year of college. Writing scholars have addressed the ways in which structural factors such as race, class, and gender influence writer identity and identity construction, and writing scholars have also studied how writers project identity through written discourse. However, neither scholars interested in high school writers nor those interested in college writers have developed frameworks or measures for studying the components, the strength, and the salience of writer identity in the transition from high school to college.</p> <p>The large-scale, longitudinal project has a survey phase and an interview phase, and the survey will be administered during the spring semester. (By January 31, a protocol for this study will have been submitted to the IRB, and the protocol would be amended later to include the McGregor fellow.) The McGregor fellow would be involved with 1) analyzing survey data from hundreds of high school students, and 2) conducting follow-up interviews with recent, college-bound high school graduates about their experiences in high school and their expectations for college. It is particularly important for me to work with an undergraduate researcher on this project because I would like many of the interviews to be conducted by a college student (a near-peer researcher) rather than a faculty member.</p>
4. Lim, Sung Soo	Economics	Poverty trap in developing countries: Prolonged illness and household debt.	<p>This project is part of my broader research agenda to examine the causes of poverty trap in developing countries. In this study, the link between adult illness and household debt growth is explored using Indonesian Family Life Survey data (2007, 2014). In developing countries, households with ill adults suffer from the economic burden of illness in the form of medical expenditures and loss of labor hours. The effects of illness are likely to be greater, compared with cases in developed countries, due to limited access of households to medical facilities, formal health insurance, and credit markets. Health shocks are also more often repeated for the poor due to their low nutritional status, hazardous living and working conditions, and inability to afford adequate treatment of their illnesses. Moreover, sudden or prolonged illness can precipitate families into an irretrievable downward spiral of welfare losses and even lead to the breakdown of the household as an economic unit. One suspected channel via which this tragic process occurs is debt accumulations over the duration of prolonged illness of household heads. In general, household debt for the poor is significantly riskier than it is for wealthier counterparts. This is often reflected in incredibly high interest rates from both informal and formal loan sources in communities where the poor have limited access to credit markets. These higher interest rates can result in debt traps that add to a cycle of vulnerability for the poor. Despite these risks, household debt plays a key role in dealing with income shocks and loans can be used for risk reduction. Thus, debt is a necessary but risky aspect of the life of those in poverty. Nevertheless, little is known about the effectiveness of loans in coping with long-term illness in developing countries. Furthermore, the effect of prolonged illness on household debt growth remains largely unexplored in empirical studies, especially in the context of developing countries. This study attempts to bridge this gap by examining the impact of adult illness on household debt growth in Indonesia. The results of this study are of special interests to policy makers who are concerned about improving their financial and healthcare system in developing countries.</p>

Faculty Name	Dept.	Project Title	Project Abstract
5. Noe, David	Classical Languages	This project involves recording an audio version of Theodore Beza's 1598 Latin New Testament (Novum Testamentum) and turning it into an app.	The only audio version of the Bible in Latin that is available is the Vulgate. This is a somewhat dated and inaccurate translation, and none of the apps feature a quality interface or good sound. There is a definite appetite and market for a recording of the Latin New Testament in an attractive and convenient format for download and use on android and Apple phones. Theodore Beza, Calvin's successor and a leading Reformer, spent more than 40 years developing his Latin text of the New Testament. The growing interest in spoken Latin provides an excellent opportunity to offer this product to Protestants, Catholics, and those of no confession alike around the world. I have already received interest in this project from a number of individuals.
6. Rohl, Darrell	History	ArchaeoSQL: Data Modeling and Relational Database Development for Archaeological Research	<p>Archaeology is a data-gathering practice, collecting enormous amounts of data at global and microscopic scales, and archaeological interpretations about the past rely upon careful analysis of data collected in the field. In this project, a McGregor Student Fellow will work with Dr. Darrell Rohl (Assistant Professor of Archaeology, History, and Digital Humanities, and Director of the Archaeology Program) to complete data modeling for a new relational database for the recording and interrogation of data collected in archaeological fieldwork and laboratory analysis.</p> <p>Initial data modeling has already begun and final implementation will utilize an opensource PostgreSQL + PostGIS infrastructure with application-specific frontends for GIS, data entry, analytics, etc. The data model will be developed as a compatible hybrid of data collection and recording systems currently in use by multiple leading archaeological excavation and survey projects, including the Calvin University Umm el-Jimal Archaeological Project, the Madaba Plains Project, Museum of London Archaeological Services, and the American School of Classical Studies at Athens - Corinth Excavation Manual. For wider accessibility and interoperability purposes, the data model will also comply with the International Committee for Documentation's Conceptual Reference Model (CIDOC CRM), including CIDOC CRM extensions designed for the recording and sharing of archaeological and related data. While CIDOC CRM has been designed to promote a shared understanding of cultural heritage information by providing a common and extensible semantic framework, it has been primarily used to translate between existing datasets. To the best of our knowledge, this project will be the first to explicitly use this international standard for a wholly new relational database for archaeological purposes.</p> <p>The McGregor Student Fellow will have experience and knowledge of relational database design, data structures and normalization, structured query language (SQL), and the implementation of databases in PostgreSQL, MySQL, Microsoft SQL Server, or equivalent. Familiarity with the command line in *nix operating systems, development experience in modern cross-platform programming languages (e.g. Python, Ruby, C/C++, C#, Go, or JavaScript), and experience with GitHub or GitLab are highly desirable. Technical training will be provided, as required, but it is expected that the Student Fellow will begin the project with minimal technical training needs. Previous experience or knowledge of archaeology and/or archaeological fieldwork is a plus but not required. An interest in archaeology, history, and the human past is desirable. Dr. Rohl will work closely with the Student Fellow and will provide both technical and/or archaeological training throughout the project period.</p> <p>The primary project output will be a functional implementation of a CIDOC-CRM compliant relational database in PostgreSQL + PostGIS, which will serve as a working server for the ongoing research of the Calvin University Archaeology Program, including the Umm el-Jimal and Hisban North Church Projects, both focused on the archaeology of Jordan from about 100 BC to AD 750. It is hoped that a co-authored paper will also be produced for presentation and/or submission to an international conference and/or publication venue such as the American Schools of Oriental Research (ASOR) or Computer Applications and Quantitative Methods in Archaeology (CAA).</p>
7. Smartt, Samuel	Communication	Luminous feature documentary distribution:	<p>Luminous, a feature documentary in post-production, follows the story and research of Calvin Astronomy Prof. Larry Molnar, who in 2017 became the first person in the history of science to predict the near-future explosion of a star. Principle photography spanned five years and produced 175 hours of footage. Release of the film is planned for mid-2021.</p> <p>The student will ideally have a background in Strategic Communication and will focus on identifying and developing institutional partners for the film Amateur Astronomical Associations, educational institutions, and churches which might have interest in screening the film upon its completion. This student will be responsible for developing and overseeing a communication strategy, cataloging and reaching out to contacts.</p> <p>The student and I will benefit from the participation of Hillary Pierce, a seasoned documentary film impact producer based out of Austin, TX, who has agreed to join the Luminous team as a consulting producer this summer as we develop this grassroots distribution campaign.</p>

Faculty Name	Dept.	Project Title	Project Abstract
& TenHuisen, Spanish Dwight		A Spanish Colonial Filipino Manuscript: Creating an English Translation and a Critical Edition	Silliman University, founded by Presbyterians in Dumaguete City (Philippines), has in its possession a Spanish manuscript from the 19th century in a clear hand. It is unique, unstudied and generally unknown even among scholars of Spanish colonial history. Despite the Philippines' 300+ years as a colony of Spain, Silliman University has few students and professors with facility in Spanish. The university, however, desires to create a critical edition of this rare manuscript, an edition that includes a translation into English, in order to make it known and to contribute to our understanding of the colonial experience in the Philippines. For this project, Spanish majors with advanced Spanish (preferably those who have studied abroad for a semester or longer and have taken upper-level courses) will learn how to read and decipher handwriting from the nineteenth century and then translate the manuscript into good modern English. As they work on the translation students will create a glossary of important key terms, as well as conducting initial research for an annotated bibliography that will be useful for the creation of the critical edition in collaboration with a team from Silliman University.
9. Turner, James	Mathematics & Statistics	Thinking Beautifully: Developing Multi-Disciplinary Christian Scholarship through the Lens of Beauty Submitted by Prof. James Turner & Prof. Laura Smit	<p>When Augustine wrote his Confessions in AD 397, it was natural for him to address God as Beauty ever ancient, ever new. Indeed, understanding God as the source and standard for beauty has been a common intuition for Christian people throughout history and remains a common intuition in most parts of the world. Although respect for beauty rises and falls within academic circles, in everyday life most people value those experiences and objects that they find beautiful. Most people find that beauty conveys meaning. Although we may differ in the particulars of what we find beautiful, the recognition that beauty matters is as universal as any recognition one could name. Therefore, we believe that beauty has the potential to be a unifying lens for Christian scholarship.</p> <p>When medieval Christian scholars began to develop universities, it was natural for them to view all disciplines from a common foundation, informed by the classic transcendentals of Truth, Goodness, and Beauty. In the spirit of ancient and medieval education, and fitting with the modern goals of the liberal arts and interdisciplinarity, we aim to recover a sense in which all disciplines are viewed from this common perspective. In particular, we seek to begin with a theological aesthetics that grounds every intellectual discipline in an ontology that establishes, rather than constrains, its methodology and epistemic goals. We seek to regain a focus on beauty, not as a matter of personal taste, but as a mark of the good and the true uniting Christian scholars of every discipline.</p> <p>It is our aim to compare and explore ways beauty is understood and expressed by Christian scholars within various disciplines in both the humanities and sciences, while also encouraging more such scholars to think about beauty as an aspect of their discipline. To that end, we seek to create a common online place where dialogs about and contributions to an understanding of beauty in these contexts can take place on an ongoing basis. We hope to create a website with the theme of Thinking Beautifully. To that end, we seek to support two students with McGregor funding to work with us creating this platform, with one student primarily responsible for web design and function while the second student would be primarily responsible for gathering content.</p>
10. Staggs, Stephen	History	Members Only: Race & Religion in the Reformed Protestant Dutch Churches in New York and New Jersey, 1772-1827	In 1788 baptized Negro men petitioned to become members of the Flatbush Reformed Protestant Dutch Church on Long Island, New York. Their petitions forced the pastor of Flatbush, the members of the congregation, and the denomination as a whole to readdress the relationship between African Americans and full communion in the church. Less than seventeen years earlier the Dutch Reformed churches in British North America gained their independence from the governing body in the Republic of the Seven United Netherlands. This meant that the members of the governing bodies in British North America became directly responsible for determining and applying their own definitions of race on behalf of the Reformed communities dotting the provinces of New York and New Jersey. However, both pastors and members of Dutch Reformed congregations owned African American slaves. What's more, it appears that the majority of the church opposed African American membership. But why? In order to answer this question, I am conducting deep archival research in order to both determine how many pastors and members of the Reformed Protestant Dutch churches owned slaves and explore how ideologies of race shaped ideas of church membership such that white supremacy became embedded in the foundation of the Reformed Church in the United States.