WOOSTER
Applied Methods & Research Experience

Annual Report 2023

AMRE

The Applied Methods and Research Experience (AMRE) Program provides consulting services to corporate, public sector, and nonprofit organizations. Consulting teams, comprised of two to four skilled students and an experienced faculty or staff advisor, provide full-time consulting services for eight weeks during the summer. The fields of expertise include mathematical/data analysis, computer science, assessment, research, and business consulting.

During the summer of 2023, 38 students (including eight from Ashesi University in Ghana – 4 in Ghana and 4 came to campus) and 19 faculty or staff advisors completed 11 different AMRE projects. Speaking to the diversity of our projects, the work ranged from a developing a website for Wayne County non-profit organizations, to studying how the College can build and better its relationship with its neighbors, to creating an interactive dashboard for analyzing test data for Goodyear, to writing a case study on the impact of AI on software development for Vivi Dynamics.

CELEBRATING 30 YEARS!

This past summer marked the 30th year of the AMRE Program! Over the past three decades, AMRE teams have successfully completed 227 projects for 74 unique clients. At the core of the AMRE program is the exceptional work completed by the student associates. Since its inception, the AMRE program has provided outstanding internship opportunities to 521 students majoring in 34 different areas of study. These experiences have allowed student associates to gain a variety of disciplinary and industry related skills, while also acting as a springboard to future career and internship opportunities.

"AMRE has been a powerful bridge builder between the community and the College. It shows that there is valuable work that students from all disciplines can do in our community and beyond," Dr. John Ramsay, founder of AMRE.

The future of the AMRE program is bright! The normalization of conducting virtual meetings has created opportunities to work with clients from across the country and around the globe. We look forward to seeing what new projects will challenge our AMRE teams as we enter the fourth decade of the AMRE program.

AMRE 2023 Projects

Members of the Galaxy Digital Team: **Minh Phan** '24, Computer Science, **Kayley Cox**, United Way, and **Maha El M'hasbi** '24, Economics.

Members of the Goodyear Team: **Professor Qimin Huang, David Sokurov** '24, Statistical & Data Science and Business Economics, **Greta Heiser** '25, Statistical & Data Sciences, **PT Fischer** '24, Statistical & Data Sciences and **Professor Marian Frazier.**

CAPACITY BUILDING

United Way

The team researched guidelines and best practices that can help Wayne County non-profit organizations increase their capacity to hire and retain employees. With the goal of creating an open-access resource for all, the team built a website with nationally recognized strategies and integrated them with local Wayne-County examples and applications.

GALAXY DIGITAL

The College of Wooster

The team developed a volunteer tracking and networking platform using Galaxy Digital to serve the community and promote inclusivity. The purpose of this digital platform is to connect the College – students, faculty, and staff – to community engagement opportunities available in Wayne and Holmes counties.

THE GOODYEAR TIRE & RUBBER COMPANY

The project was to create an interactive dashboard that would allow the client to analyze their testing data efficiently. The team built the dashboard using Tableau, a powerful data visualization tool. Working closely with Goodyear's IT team to extract data from their system, the AMRE team cleaned and transformed the data to be easily visualized in Tableau. Once the data was ready, the AMRE team created charts and graphs, highlighting vital metrics. Interactive filters were added to allow users to quickly drill down into the data and analyze it more thoroughly. Additionally, a series of tabs was added to allow users to switch between data views, thus making the dashboard more interactive. Feedback from the client was incorporated throughout the process. The final result was a powerful and intuitive dashboard that allows Goodyear's team to quickly analyze their testing data.

KILLBUCK WATERSHED LAND TRUST

IMPACT ON WHITE OAK TREES

Climate change is causing increased precipitation and more frequent and intense storms in Wooster, OH. White oak (Quercus alba) tree rings can serve as a record of past climatic conditions and can be analyzed to determine tree response to a changing climate. The team analyzed white oak tree rings to see how the species is responding to a wetter climate and to learn how white oaks are responding to climate change.

Members of the Schneider Electric Team: **Yamoah Attafuah** '24, Computer Engineering at Ashesi University , **Diya Misra** '25 Computer Science and Psychology, **Yasmine Fazazi** '24, Computer Science and Psychology, and **Levi Gainer** '24, Computer Science..

Members of the Student Affairs Team: **Kiran Ravichandran** '25, Statistical & Data Sciences, **Josh Pearson** '24, Mathematics, **Dean Cliff Bobbitt**, and **Adelle Hasford** '24, Computer Science at Ashesi University.

Members of the Vivi Dynamics Team: **Professor Heather Guarnera, Chudah Yakung** '24, Computer Science at Ashesi University, **Jason Berry**, Founder of Vivi Dynamics, **Aryan Tamraker** '24, Computer Science, and **Siham Boumalek** '25, Computer Science.

PLACEMAKING

The College of Wooster

The College of Wooster takes great pride in fostering an inclusive and supportive community that embraces individuals from diverse backgrounds and perspectives. Using Placemaking theoretical framework, the team recommended 33 project that will help create more positive and engaging interactions and sociable places on campus. The projects have their own detailed profiles and are grouped by their temporal categories.

SCHNEIDER ELECTRIC

The goal of the project was to automate the process of data extraction from documents using Azure's implementation of the OpenAI API and GPT models. The AMRE team ran experiments on different metrics, parameters, and prompt engineering techniques. The extensive tests and research led the team to develop a data extractor program and a best practices guide to improve Schneider Electric's use of large language models and prompt engineering techniques.

STUDENT AFFAIRS

The College of Wooster

The team contacted the offices under Student Affairs, Student Engagement, Athletics, Campus Safety, Wellness, and Residence Life to better understand their data handles. This interaction helped the team identify useful Key Performance Indicators for each office and make essential data collection and storage suggestions. To understand which of these KPIs were significant for student retention as well, the team performed statistical analyses on two datasets from prior years using various machine learning techniques, including but not limited to logistic regression, predictive analysis, decision trees, and random forests. The team then explored retention trends at Wooster over the last decade and a half, making forecasts for retention rates and the reasons for attrition. Methods included creating time series analysis and forecasting & stationarity tests.

ASHESI COLLABORATION

SIGN WITH ME

The SignWithMe project was an eight-week project with the objective of delivering a mobile app that teaches the Ghanaian Sign Language for our client the Asheshi Sign Language Club. The app also includes a speech to text and text to speech system to aid the communication between the Hard of Hearing/Deaf communities and the Hearing communities. The mobile app is an inclusive platform that has the potential to bridge the gap between the Hard of Hearing/Deaf communities and the Hearing communities.

ASHESI COLLABORATION

TIEME N'DO

As a Global AMRE Project, the team worked to provide Tieme Ndo; a Ghanaian Northern-based agricultural social enterprise, with tangible ideas on how to scale up its operations and grow. This was in line with the organization's goal of reaching 100,000 farmers by 2033 and having a huge impact on rural farming in Northern Ghana.

VIVI DYNAMICS

The project was to write a case study on the impact of AI on software development. The team's focus was specifically directed towards evaluating the effectiveness of prominent AI tools in the field, namely ChatGPT, Google Bard, and GitHub Co-pilot. To achieve that, the team documented their interactions with these AI tools, while developing new features into the administration panel of the Vivi Dynamics website.

Members of the Workforce Childcare Initiative team: **Endrias, Tesfaye** '24, Economics, **Professor Brooke Krause**, **Professor Melanie Long**, **Sam Adjei-Sah** '24, Economics, **Emmanuel Aboagye-Wiafe** '24, Business Economics.

WORKFORCE CHILDCARE INITIATIVE

Community Action Wayne& Medina, and Wayne County Economic Development Council

This AMRE team canvassed the childcare landscape in Wayne County, OH by surveying employers and childcare providers regarding childcare needs, and researched workplace childcare center models. The project identified and assessed the gaps in childcare through a spatial analysis and identified best practices in designing workplace childcare centers to identify recommendations for a program model and pilot initiative here in Wayne County.

MISSION STATEMENT

The AMRE program provides a quality immersive experiential opportunity for students at the College of Wooster. Students solve authentic problems in business, industry, government agencies and social service agencies as well as in academic research areas. In the process, students reflect on their contributions and develop an understanding of how the experience can be translated into future opportunities.

The College of Wooster offers its students a unique educational experience while further establishing collaborations with our local and regional corporate, public sector, and nonprofit partners.

- **Our clients** get help solving problems or completing projects that have lingered on "to-do" lists.
- **The students** apply what they have learned in the classroom to solve real-world problems. Often the experience helps them develop their career aspirations, and sometimes they learn what they don't want to do for a career. Always, they have an experience that can't be found inside the classroom.

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