



Undergraduate Summer Research Academy

Project Details

Research Project Title:	<u>Project 1</u> COVID-19's Impact on College Students' Lifestyle, Media Consumption, Learning Habits, and Mental Health.
Research Professor:	Dr. Chen Yang , Communication & Organizational Leadership Department, SIHSS
Research Project Title:	<u>Project 2</u> Too Conservative? Female CEOs and Political Connections
Research Professor:	Dr. Anna Abdulmanova , Finance Department, SBUS
Research Project Title:	<u>Project 3</u> Preparing Teachers to Work with English Learners: A Service Learning Project
Research Professor:	Dr. Ying Zhang , Education Department, SNEHS
Research Project Title:	<u>Project 4</u> Co-optimization of Power System Restoration and Utility Truck Vehicle Routing
Research Professor:	Dr. Sangho Shim , Engineering Department, SEMS
Research Project Title:	<u>Project 5</u> Researching Reading Strategies Employed by Undergraduate Students
Research Professor:	Dr. Carianne Bernadowski , Education Department, SNEHS
Research Project Title:	<u>Project 6</u> Skills Matching
Research Professor:	Dr. Nader Kesserwan , Engineering Department, SEMS

Application Deadline
March 31, 2021



Project 1 of 6

Research Project Title: I COVID-19's impact on college students' lifestyle, media consumption, learning habits, and mental health.

Research Project Summary: This is a survey project focusing on examining college students' transition from learning on-ground to online mode during the COVID-19 pandemic. The survey will collect extensive information related to college students' media use and news consumption habits, learning styles and effectiveness, student-and-teacher communication, as well as their lifestyle and mental health. The study intends to find out the significant changes in the above areas before and after the pandemic and to investigate the pros and cons of online learning and virtual communication and how they have affected students' academic performance and mental wellness. This study is expected to provide valuable suggestions for professors, academic advisors, university administrators, and parents.

Student Research Objectives:

1. Students will learn the basic steps of conducting an online survey study.
2. Students will understand the importance and process of IRB application.
3. Students will learn how to collaborate with the faculty in writing a scholarly research paper.

Skills Required:

1. Students are expected to have taken at least one research method class.
2. Knowledge in statistics and survey research is recommended.
3. Excellent academic writing skills are needed.

Expected Student Research Outcomes:

1. A research poster will be created based on the data collected during the 6-week project.
2. At least one manuscript will be submitted to a peer-reviewed scholarly conference or periodical.

Research Professor: Dr. Chen Yang, Communication & Organizational Leadership Department, SIHSS



Project 2 of 6

Research Project Title: Too Conservative? Female CEOs and Political Connections

Research Project Summary: Finance literature demonstrates that female CEOs are more conservative than male managers. Firms managed by female executives acquire less debt and are less likely to invest through acquisitions and research and development. Corporate political contributions are considered to be a form of corporate investment with greater uncertainty and higher returns compared to traditional forms of investments. I plan to examine whether female CEOs remain conservative when it comes to political investments and how their corporate investment decisions affect performance and value of such firms. Specifically, I'm interested in the following research questions:

- are firms managed by female executives less likely to make political donations?
- if so, do firm shareholders receive lower returns than shareholders of politically active firms?

Student Research Objectives:

1. to conduct a literature review
2. to identify relevant research questions and formulate hypotheses
3. to construct data sample from other commonly used financial datasets
4. to describe data sample with relevant univariate statistics
5. to use linear and logistic regressions to test hypotheses
6. to interpret statistical results and relate them to stated hypotheses

Skills Required:

Desired skills: 1.coding (R, Stata, Sas); 2. regression analysis; 3. statistical analysis of panel data

Required coursework: STAT2110, INFS4160 (preferred)

Required knowledge: 1. linear regressions; 2. logistic regressions

Expected Student Research Outcomes:

I expect the project to answer the following research questions: 1. Are firms managed by female CEOs less likely to make political contributions than firms with male executives? 2. Do these firms make smaller political contributions than firms with male executives? 3. Do these firms "miss out" on returns from political connections? 4. Are these effects robust for all industries?

Research Professor: Dr. Anna Abdulmanova, Finance Department, SBUS



Project 3 of 6

Research Project Title: Preparing Teachers to Work with English Learners: A Service Learning Project

Research Project Summary: This research project titled Preparing Teachers to Work with English Learners: A Service Learning Project aims to explore pre-service and in-service teachers' perceptions on working with English Learners (ELs) through service learning opportunities. In Fall 2020, a pilot study has been conducted with some teacher candidates. Students were matched with local ESL teachers or EL parents to provide online tutoring activities or teacher help (such as helping the teacher create teaching materials used for ELs). The initial data showed that the majority of the students believed the service learning opened their eyes on ELs and allowed them to learn more about struggles that ELs face.

Next year, a formal study is planned to be conducted with all undergraduates and graduate students enrolled in my two courses: EDUC3165 and EDUC6400. The summer research project thus is considered as a preparation for the actual study. Specifically, the summer research project involves 1. conducting a literature review about service learning projects in teacher education that targets on teaching ELs; 2. finalizing the research design based on the literature review and the pilot study; 3. developing research instruments, including interview questions and/or survey; 4. preparing IRB documents.

The student who is selected to work on the project will particularly focus on learning how to search for scholarly publications to create a literature review, although he/she will also be shadowed in other aspects of the research design. Considering the student might have limited experience in research, some introductory reading will be introduced.

Student Research Objectives:

1. Student will be able to locate scholarly publications using the data base.
2. Student will be able to summarize and synthesize information found in literature.
3. Student will be able to create a literature review following the examples provided by the faculty.
4. Student will be able to create a poster highlighting the steps and tips of creating a literature review.

Skills Required:

1. The student is interested in academic research.
2. The student has excellent writing skills.
3. The student majors in humanities and social sciences.
4. The student is interested in research topics involving culturally and linguistically diverse populations.

Expected Student Research Outcomes:

1. Student will be able to write a literature review following the faculty-provided examples.
2. Student will be able to create a poster highlighting the steps and tips of writing a literature review.
3. Student will be able to conduct a mock poster presentation.

Research Professor: Dr. Ying Zhang, Education Department, SNEHS



Project 4 of 6

Research Project Title: Skills Matching

Research Project Summary: The power outages caused by weather events become more and more frequent. The enormous impact of extended power system blackouts following recent cascading failures highlights the need for a more resilient grid that can recover rapidly from disruptions. In a large scale blackout, the utility companies need to design a collaborative plan to quickly repair the entire network and restore electric services.

The project studies the co-optimization of power system restoration and utility truck vehicle routing problem (or Power-VRP). The power network data and the computational frameworks are sourced by the advisor's joint project with the Argonne National Laboratory (supported by the 2020/2021 Visiting Faculty Program of the US Department of Energy). This project develops an integrated plan to restore a bulk power system after a large scale blackout such as the Northeast Blackout of 2003.

The first component of the project develops a parallel power system restoration schedule to restore the non-blackstart generators which cannot start on themselves. The second component is utility vehicle routing during restoration. The students will integrate the mathematical programming formulations of the two components, and solve the integrated formulation using a mathematical programming solver GUROBI. The maximum capacity of this project is up to 6 students.

Student Research Objectives:

- Understand the impact of a large scale blackout (ex. The Northeast Blackout of 2003)
- Understand the components of a power system restoration plan
- Study computational methods to develop the optimal restoration plan
- Develop the logistical component (utility vehicle routing) of the plan
- Discuss further work to improve the current computational methods

Skills Required:

- Mathematical programming modeling technique (ENGR3900 Optimization Technique)
 - Python coding to run a mathematical programming solver GUROBI (ENGR3950 Computational Optimization)
- * The Advisor will teach the students essential components of ENGR3900 and ENGR3950 for this Undergraduate Summer Research project in the beginning.

Expected Student Research Outcomes:

- Faculty publications with the student co-authors in an educational journal such as Decision Science Journal of Innovative Education.
- Opportunities to discuss with top scientists at Argonne National Laboratory.

Research Professor: Dr. Sangho Shim, Engineering Department, SEMS



Project 5 of 6

Research Project Title: Researching Reading Strategies Employed by Undergraduate Students

Research Project Summary: The proposed research project will allow the undergraduate researcher to experience the mixed methods research experience from beginning to end. The student will engage, with faculty supervision, in the collection of both qualitative and quantitative data, analyzing that data and writing up the results. It will be an expectation that the student researcher will also work on synthesizing the literature associated with the research. It is the goal of the faculty to mentor an undergraduate student to become a researcher.

Student Research Objectives:

1. learn to navigate the RMU library database and peer reviewed literature
2. learn to summarize and synthesize literature
3. learn to interpret survey data
4. learn to display data for presentation purposes
5. learn to write a methods section of a journal article
6. learn to collect data via semi-structured interview
7. learn to transcript transcripts, code data and create themes
8. learn to write for academic, research purposes

Skills Required:

1. navigate the RMU library database
2. write for academic purposes
3. understand the purpose of research
4. learn to use survey platforms for survey distribution
5. willingness to work closely with faculty and follow directions
6. work independently when needed

Expected Student Research Outcomes:

1. Student will be expected to coauthor the research findings in some form (paper or presentation) upon successful completion of the goals of the experience.
2. Student will be expected to apply the research strategies gained by collecting and analyzing data.
3. Student will be able to articulate the research process acquired during the experience.

Research Professor: Dr. Carianne Bernadowski, Education Department, SNEHS



Project 6 of 6

Research Project Title: Skills Matching

Research Project Summary: The industry response to technological changes is more effective and much faster than what RMU can do to keep up and train its interns. This variance could have developed a skills gap between what employers value and rely upon and the skills that interns possess. This mismatch makes it difficult for interns to find the appropriate internships and for employers to find appropriately trained interns. In this context, it is important to conduct a research that identifies the mismatch to understand employer perspectives on hiring and identify what type of skills our interns have or need to develop. Furthermore, we are seeking to anticipate future skills needs in a target discipline and avoid potential mismatch.

Student Research Objectives:

1. Collect and document the challenges that employers (target a discipline) are encountering as well as the innovative solutions they are pursuing.
2. Search about breakthrough technology that affect the target discipline and anticipate the required skills
3. Collect and document the various skills that interns possess, likely to have and desired
4. Gap analysis between the collected data; required and desired skills that employers are looking for and interns possess
5. Result classification of the gap analysis into 4 categories (Perfect match, match, matchable if, and mismatch)

Skills Required:

1. Critical thinking.
2. Accessing and analyzing information.
3. Effective oral and written communication.
4. Advanced skills in Excel or in any plotting applications.

Expected Student Research Outcomes:

1. Classification of interns skills into different categories.
2. Recommendation to internship program.

Research Professor: Dr. Nader Kesserwan, Engineering Department, SEMS