

Undergraduate student research practices at FGCU, examples, outcomes, opportunities, and challenges

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College of Business

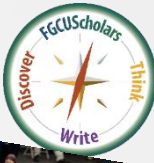
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Contributors: FGCUScholars QEP Team, QEP Faculty



Student Scholarship & Professional Development



- **On-Campus Events**



- **10 Disciplinary-Specific Symposiums**

- STEM (125 students), Humanities (5), Philosophy (6), Social Science (31), Biodiversity (12), Community-engaged scholarships (12), FGCU Chamber Choir (27), Honors student research (22), & Communication (32)

- **University-Wide**

- FGCU Research Day, since 2002 (2016: 137 posters, 18 oral presentations)
 - SURE: Showcase of Undergraduate Research Experiences, January, 2018
 - Writing Awards: 102 participated for recognition in 14 writing categories

- **Travel and Research Mini Grants**

- Supported 176 students university-wide
 - 81 Projects and 42 Faculty Mentors

- **FGCUScholar Ambassadors**

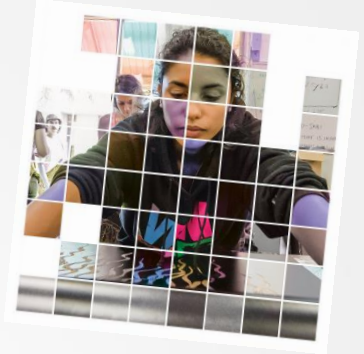
- Student leaders advocate for students & develop programming for peers

- **Student Journals**

- Aquila, FGCU's Student Research Journal & Mangrove Review
 - 37 students published 15 papers and 10 creative pieces.



UG Research Practices



• Course-embedded Research Practices

- Designed into course syllabus as a special assignment or semester-long project
- Outcomes
 - Abstract/ poster presentation/ Competition at FGCU Research Day, at FURC, or other symposiums

• Research practices outside the classroom

- Research with Faculty guidance/ mentoring as independent study or student-faculty collaborative research projects as a result of grants
- Outcomes
 - Abstract/ poster presentation/ Competition at FGCU Research Day, at FURC, regional and national conferences, proceeding papers, journal papers





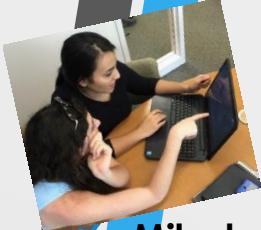
Audience

Are you involved with course-embedded research?

**Are you involved with faculty- student collaborative
research outside classroom?**

Are you involved with both?

Course embedded/associated research typical steps



Milestone 1: Inquiry:

- ✓ Identify a research problem that will lead you to collect and analyze data. Describe the issue, its significance, benefits to the business or community, what you would like to achieve at the end of your study (possible findings).
- ✓ Class presentation by local businesses, such as Herc Rental, Arthrex, Chico's, Shaw Development, Lee Memorial Health System

Milestone 2: Research, Creation:

- ✓ Literature Review, Data Collection, Descriptive Data Analysis, Sample size check, Research Hypotheses

Milestone 3: Implementation, Analysis:

- ✓ Hypotheses testing, Comparison of two means-ANOVA or Regression Analysis, Forecasting models, Spreadsheet modeling and simulation.

Milestone 4: Synthesis:

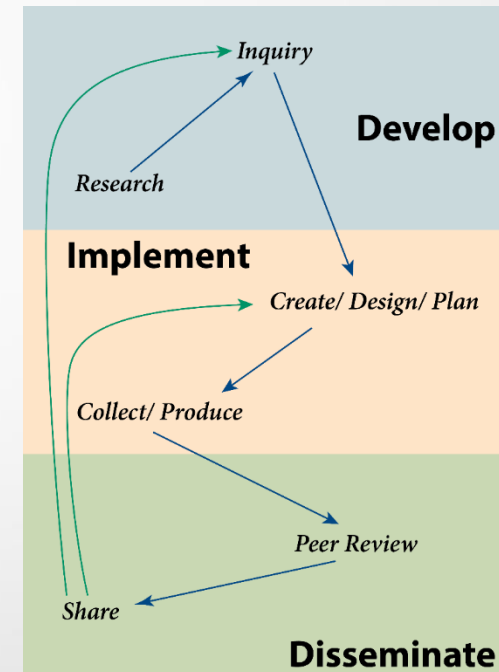
- ✓ Draft report and data analysis, results, solution.

Milestone 5: Writing, Presentation:

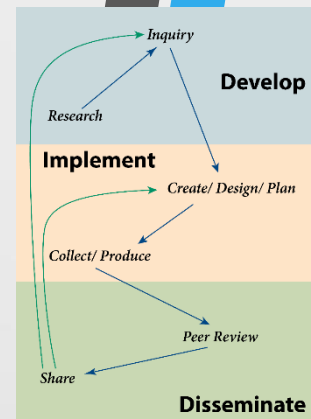
- ✓ Project report and presentation to peers, Report consists of problem description, summary of results, Interpretation of the findings, benefits, shortcomings.

Milestone 6: Poster presentation

FURC; FGCU Research Day and other symposiums,
Participation to FURC



Faculty- Student Collaborative Research typical steps



- ✓ **Inquiry:** Meet with Faculty mentor to discuss student's idea for research, or Faculty's research scope, grant outline, response to research call
- ✓ **Research:** Literature review. Meetings with Industry, experts, e.g.
- ✓ **Creation/Design:** Survey design, data collection, interviews, survey dissemination, design of experiments, field trips, data recording
- ✓ **Implementation, Analysis:** Data analysis, Hypotheses testing, statistical analysis.
- ✓ **Implementation, Synthesis:** Research results, conclusion(s), future research prospects
- ✓ **Writing, Presentation:** Preparation of conference abstract, poster, proceeding paper presentations and draft papers at conventions, conferences, symposiums
- ✓ **Journal paper publications:** Student self and/or faculty-student collaborative writing at University journals (Aquila), and professional journals.



Examples from Business-Course embedded research



**Faculty, Mentor: Dr. H. Julie Yazici, ISOM Dept.
Courses: Business Analytics (QEP designated course);
Operations Management (required course for business)**

- **Tim Bohanon, Suzanne Woods- The effects of the per barrel price of West Texas Intermediate Crude Oil (WTI) on annual US retail sales**
 - Winner of the Dean's Award for Best Poster at FGCU Research Day 2017
 - Participation at FURC
- **Suanny Gonzalez- Student Career Debts versus Job Salaries**
 - Poster competition at the FGCU Research Day 2017.
- **Bradley Findlan and his team-U-Ridr: Student-to student ride sharing**
 - Oral presentation at the FGCU Research Day 2017.



Examples of Faculty-Mentored Research in Business

Faculty Mentor: Dr. Kaitlyn Harger, Economics/Finance Dept.

- **Mitchell Page- Do Non-Citizens affect U.S. Congressional Elections?**
 - Winner of the Dean's Award for Best Poster at Research Day 2016
 - Publication in *Applied Economics Letters*)
- **Cameron Letch- The Effect of the Qualified Industries Tax Credit on Employment and Business Growth in Florida**
 - Second place winner at Research day 2017,
 - Presentation at the National Undergraduate Research Conference in Memphis, TN in Spring 2017.
- **Petra Besenhard - Bright Futures Scholarship and Minority Enrollment**



Examples of Course-Embedded Research in Health Professions

Faculty Mentor: Peter Reuter, Rehabilitation Sciences

Course: Anatomy & Physiology I (Honors sequence)

• Student Health Behavior and Academic Performance

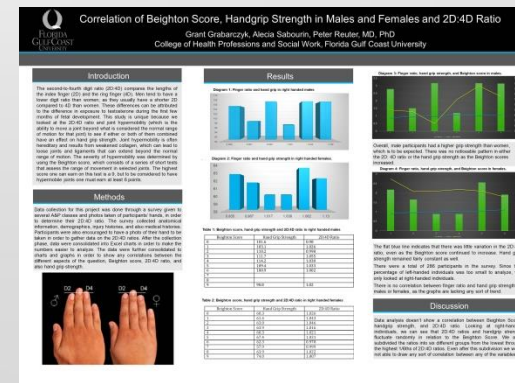
- 23 Honors students
- Working on lit review and IRB application
- Goal: All students (alone or in groups) will present poster or give oral presentation at FGCU (Honors symposium, Research Day, MCHHS Symposium)
- Some may present at regional/national conference or write article for submission to peer-reviewed journal



Examples of Faculty-Mentored Research in Health Professions

Faculty Mentor: Peter Reuter, Rehabilitation Sciences

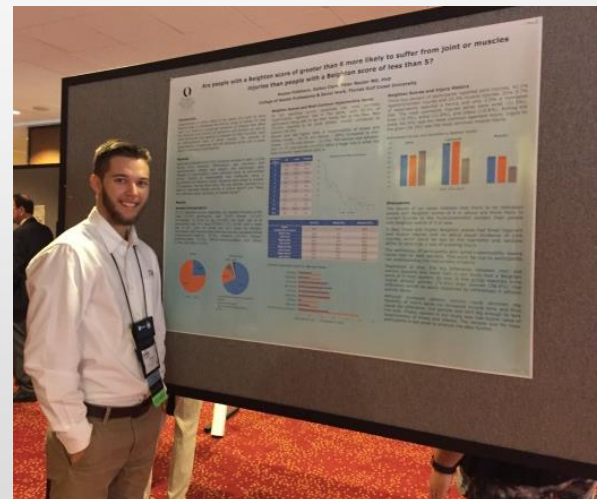
- **2D:4D Ratio and Anthropometric and Physiologic Differences in Men and Women**
 - Initiated by Honors student; UG student team (9 students overall) worked on the project outside the classroom from 2014-2016
 - All students presented results as poster presentation at three national conferences
- **Hypermobility Joint Syndrome**
 - Initiated by UG student who is now a graduate student (Physical Therapy) at FGCU; UG student team (6 students) worked on the project outside the classroom from 2015-2017
 - All students presented results as poster presentation at national conference; grad student is working on article for submission to peer-reviewed journal as co-author of faculty



Examples of Faculty-Mentored Research in Health Professions

Faculty Mentor: Peter Reuter, Rehabilitation Sciences

- **Why do students have sex?**
 - Initiated by faculty; UG student team (6 students) worked on the project outside the classroom starting in Fall 2015; Data collection closed a few weeks ago
 - All students have left FGCU or the research team; faculty is working on articles for peer-reviewed journals



Examples of Course-Embedded Research in Engineering

- **Environmental Engineering Course Embedded Research (Faculty: Dr. Ashley Danley-Thomson)**
 - The Wastewater Microbiology class; The Solid Waste Management class projects.
- **Software Engineering Course Embedded Research (Faculty: Dr. Janusz Zalewski & Dr. Fernando Gonzalez)**
 - CEN 4065 Software Architecture and Design and CEN 4935 Senior Software class projects
- **Bioengineering Course Embedded Research (Faculty: Dr. Derek Lura, Dr. Chris Geiger, & Dr. Jiehong Liao)**
 - BME 4211C Biomechanics, BMC 4800C, Senior Design research projects



Examples of Faculty-Mentored Research in Engineering

Faculty Mentor: **Dr. Ashley Danley-Thomson**

Environmental Engineering

- **Determining Effects of Class I Landfill Leachate on Biological Nutrient Removal in Wastewater Treatment** (collaboration between academia, government and industry partners)
- **Biosand filter design for implementation in small, rural communities in Kenya**
- **Does improved water quality enhance health outcomes in under-serviced areas in developing nations**

Faculty Mentor: **Dr. Derek Lura**

Bioengineering

- **Development of a Virtual Reality Gait Rehabilitation System** (collaboration with NCH Healthcare and pursuing funding from the National Institute of Neurological Disorders and Stroke)
- **Biomechanical Gait Analysis in Patients Post-Stroke** (collaboration with NCH Healthcare)
- **Lower & Upper Limb Prostheses Research** (collaboration with USF Center for Neuromusculoskeletal Research and Center for Assistive, Rehabilitation & Robotics Technologies)

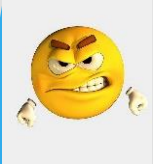


Opportunities and Challenges



• Opportunities

- Have a greater impact on students
 - Students gain research skills early on
 - Enhance critical thinking, creativity and communication skills
 - Students become scholars
 - Students contact with industry, job prospects
- Increase research output
- Relive the thrill of starting out as a researcher again (and again)



• Challenges

- Finding the “right” and motivated students
- Staying patient when things don’t work as planned or students give up
- Need to provide very clear outline and directions to students
- Funding (lengthy process, not always successful)- for collaborative research





Audience



Opportunities?



Challenges?

THANK YOU

"Without passion, you can't get a good score." - Unknown

Everything was impossible until someone did it.

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