

Opening Doors/Abriendo Puertas



For Hispanic and Minority Students
Through Undergraduate Research



- Opened in 1960
- Offers over 285 programs of study
- 8 campuses and 1 center
- Enrolls the highest number of Hispanic students and second-highest number of African American students in the U.S.



What is Undergraduate Research?

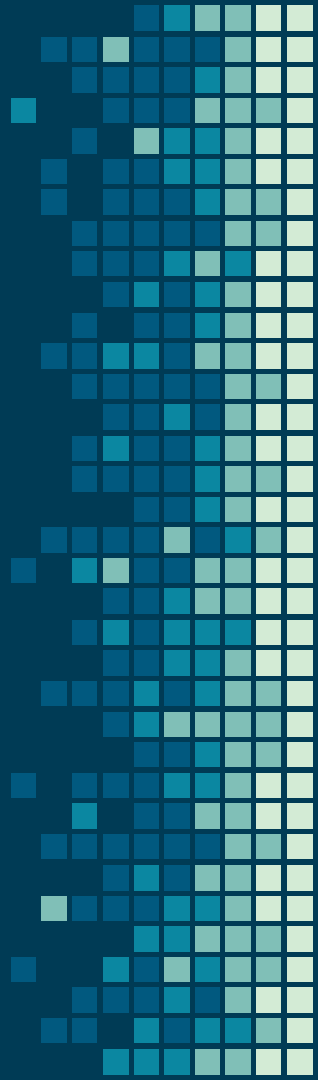


“

An inquiry or investigation conducted by an undergraduate student that makes an original intellectual or creative contribution to the discipline.

High Impact Practice

- Explore interests and establish career goals
- Build transferable skills (communication, problem solving, teamwork, critical thinking skills, etc.)
- Connect with faculty
- Gain unique in-field experience
- Promote interest in graduate school
- Improve self-efficacy
- Increase retention and completion



Engaging Faculty

Information Sessions

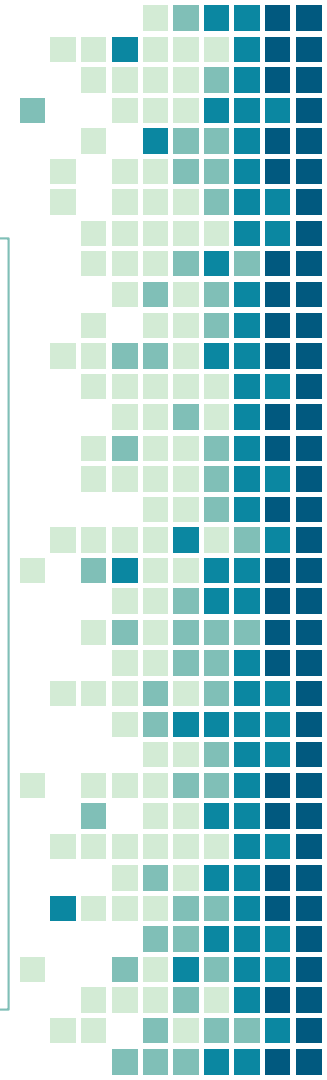
- Proposal guidelines
- Encourage networking
- Clarify expectations to ensure student-centered experience

Incentives

- Project selection
- Student selection
- Budget for equipment & supplies
- Stipends/ release time
- Consideration for future research opportunities

Simple Application Process

College administrator reviews applications and approves project proposals



Students: Recruitment, Eligibility & Selection

Recruitment & Eligibility*

- Recruiting workshops, faculty referral, websites
- Must be STEM degree seeking students
- Minimum GPA requirement
- Application Forms: Questionnaire, Letters of Recommendation, Essays
- Citizenship requirements for stipends

Selection*

- Students are paired according to their interest
- Faculty research mentors refer students or pre-select
- Students' location or main campus is considered in matching with projects

* Selection and eligibility requirements vary slightly between the three programs. Each program has its unique recruitment, eligibility, and selection process.

Program Requirements

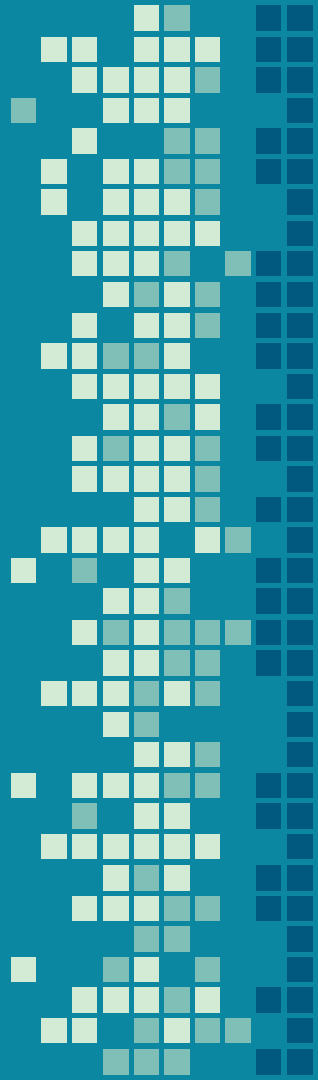
Selected candidates are required to fulfill the following:

- Engage in research/project activities during the research term
 - Dedicate 5-20 hours per week for the research/project.
 - Work under the guidelines of designated faculty mentor
- Complete designated professional skills workshops
 - Orientation, Lab Safety, Lab Notebooks, Research Ethics, Data Analysis and Presentation, and Abstract and Poster Creation

Program Requirements

Selected candidates are required to fulfill the following:

- Submit an abstract and scientific poster for their project
- Attend and present their research at the Annual STEM Exhibition and/or Annual STEM Research Symposium
- When appropriate, provide an oral presentation of research findings at a designated locale
- Satisfactory evaluation by faculty mentor



Making Research Work

MDC Wolfson

STEM ARCOS
(Accelerate, Retain,
Complete with
Opportunities and
Support)

Collegewide

SRI
(STEM Research
Institute)

MDC Kendall

STEM TOP
(Talent Opportunity
Priority)

STEM RESEARCH INSTITUTE (SRI)



Miami Dade
College

School of Science

409

Student Participants

Funded by seven grants from the U.S. Department of Education, National Science Foundation, and U.S. Department of Agriculture

11

Research Sites

Faculty mentors at seven MDC campuses, Florida Atlantic University, Nova Southeastern University, St. Thomas University, and the University of Florida

70

Projects and Mentors

70 faculty mentors, across all STEM disciplines. Students have presented at local, regional, national, and international conferences and symposia.



A

Accelerate



Funded by the U.S. Department of Education, Developing Hispanic-Serving Institutions Program - Title V

R

Retain



Five-year grant that runs from October 1, 2015 to September 30, 2020

C

Complete



Name derived from "arches"—a curved structure typically seen in architecture—capable of supporting significant weight

O

Opportunities



Aim is to increase retention, completion, and successful transfer and transition to four-year STEM related programs

S

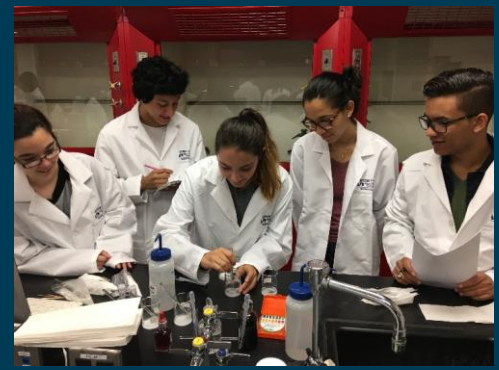
Support



Composed of two activities: SMART Student Services and ARCAcademics offering the academic support structure

Undergraduate Research and Project Opportunities (URPO)

- Fall, Spring, and Summer
- Faculty submits a project proposal
- Students are paired by interest; faculty sometimes have pre-selected students
- Students are required to commit at least 5-10 hrs. a week for research.
- Faculty researchers evaluate students at the end of semester
- Student stipends approx. \$100/month
- Required to present at symposiums, expos, etc.





Undergraduate Research and Project Opportunities (URPO)

49

Student Participants

Collaborations with Faculty from MDC in Mathematics, Biology, Chemistry, Physics, Data Analytics, University of Miami, Chemistry Dept, and School of Medicine

93%

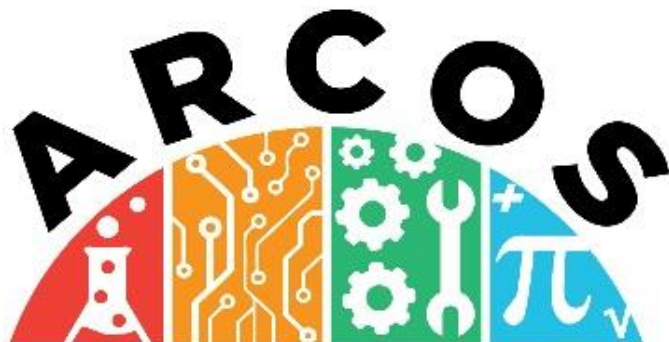
Retained/Graduated in STEM

Presented at Life Sciences South Florida STEM Undergraduate Research Symposium, North Campus Research Symposiums, PBL Expo; ACS Research Symposiums

100%

Accomplishments

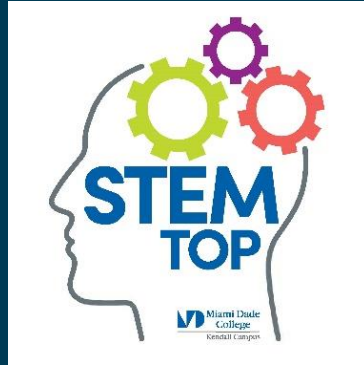
Completion of research assignments; Average overall GPA of 3.76; 4 students have names in 2 publications-data analytics & UM chemistry dept.



SCIENCE • TECHNOLOGY • ENGINEERING • MATHEMATICS

Science
Technology
Engineering
Math

Talent
Opportunity
Priority



- U.S. Department of Education Title V Grant Program (5 years)
- Campus-wide grant
 1. Peer-Led Team Learning
 2. Drop-In Tutoring
 3. Undergraduate Research (P.R.I.S.M)

P.R.I.S.M.

Program Research in Involved Science and Math

Majors

| | |
|---------------|-----|
| Engineering | 32% |
| Chemistry | 32% |
| Biology | 18% |
| Physics | 5% |
| Computer Sci. | 5% |

Common Courses Taken

| Course | % |
|----------|-----|
| MAC 1147 | 77% |
| MAC 2311 | 77% |
| MAC 1105 | 59% |
| BSC 2010 | 41% |



| PRISM Post Student Survey | Agree |
|--|-------|
| It is important that I had the ability to engage in practice, hands-on research | 95% |
| It was important that I had intensive research collaboration in a group setting | 95% |
| It was important that the program took place during the summer months | 91% |
| My involvement in undergraduate research has enhanced my learning experience as a STEM major | 95% |



PRISM 2016
12 Students

- Mathematical Model to Describe Propagation of Infectious Diseases: Zika Virus
- Exploring the Bimodal Distribution of Hurricane Intensities

PRISM 2017
24 Students

- College enrollment tendencies: a data mining approach
- The Bahama bank and its influence on South Florida from Atlantic tsunamis
- Research, design & implementation of a renewable energy (solar) recharging station
- Study of metallic photonic band gap material at microwave frequencies

PRISM 2018
16 Students

- Describing tumor-host interactions using a Hamiltonian dynamics formulation
- Behavior of fluids: Mathematical description of the thermodynamic of the methane bubbles on sea water.
- Investigating the antimicrobial properties of plant extracts

PRISM 2019
23 Students

- Application of Mathematical Models in Cancer Research
- A logistic regression model to determine the proportion of variance associated with shark attacks in Florida.
- A comprehensive analysis on factors influencing the level of mercury in edible fish

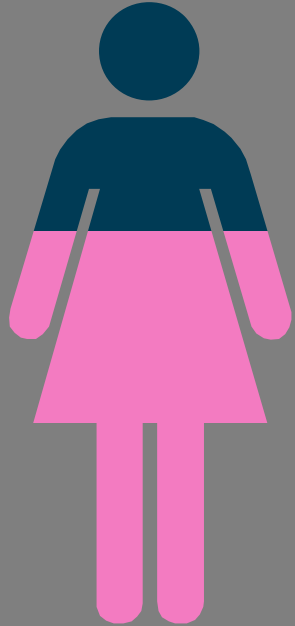
STEM Student-Researcher Retention Rate: 99%

Annual STEM Research Symposium



Our Students:

Female

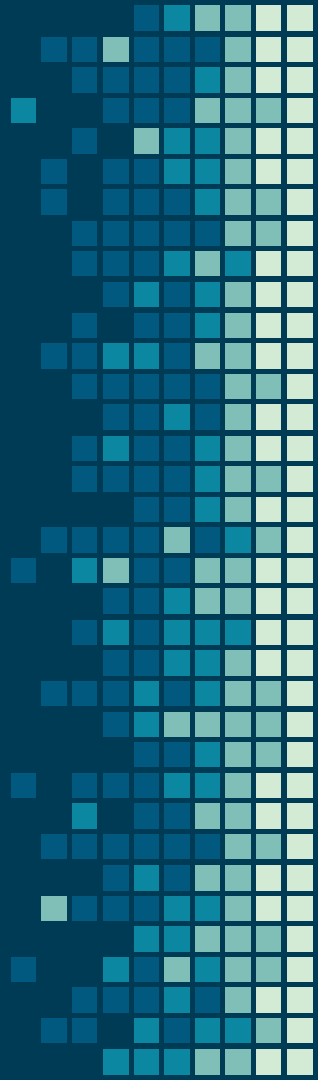


60%

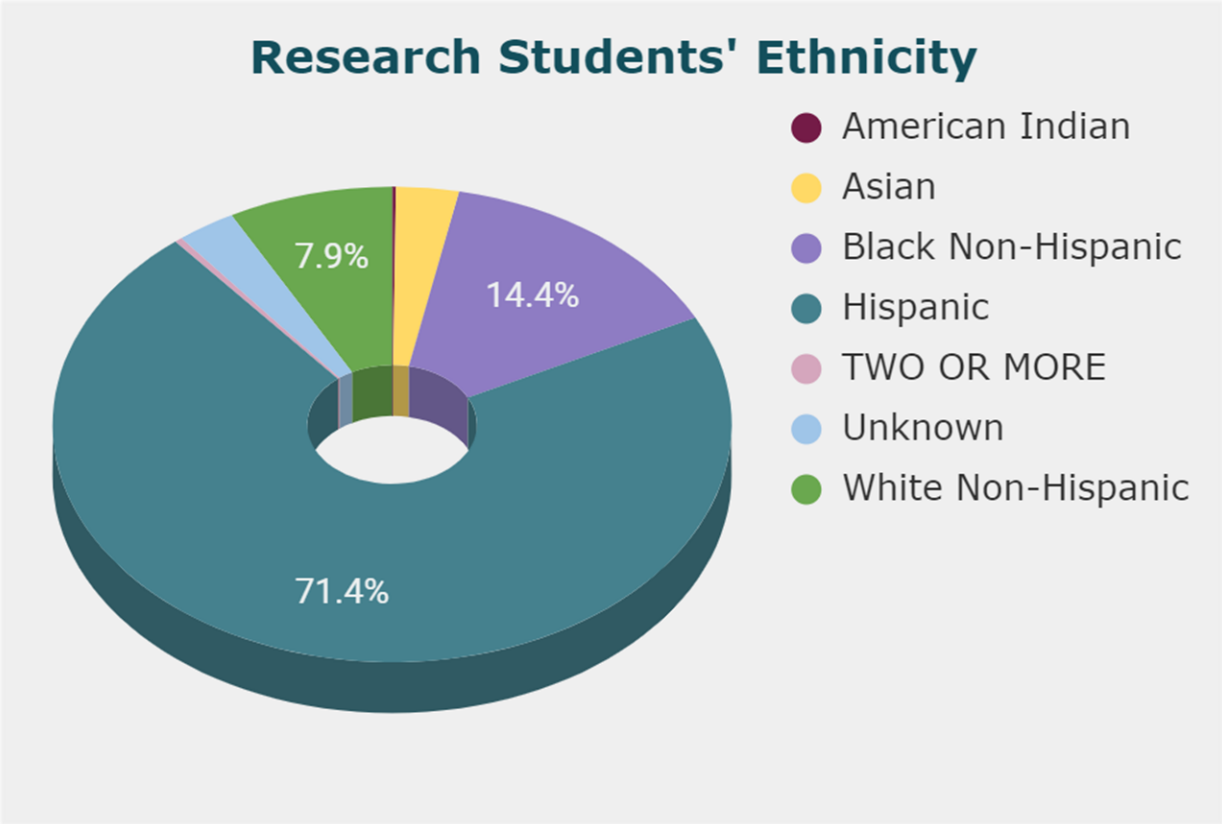
Male



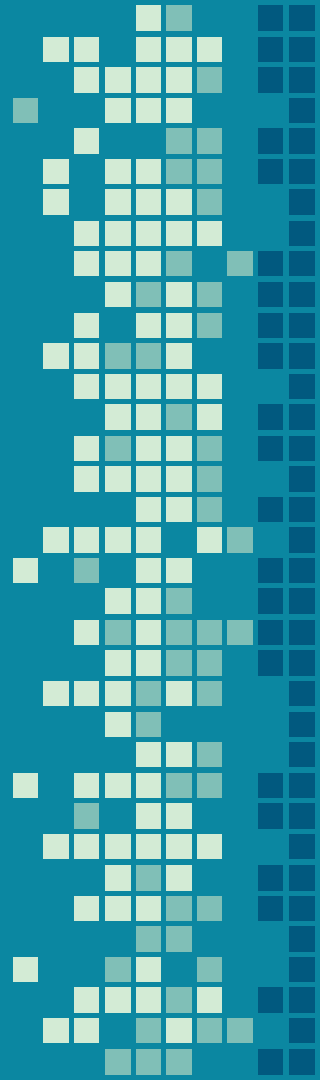
40%



Our Students:



Research Works



Research Participants as Compared to Non-participating STEM Students

94% RETENTION RATE

Fall-to-fall retention rate

78% RETENTION RATE

Fall-to-fall retention rate of STEM students

3.62 AVERAGE GPA

Research

3.22 AVERAGE GPA

Non-

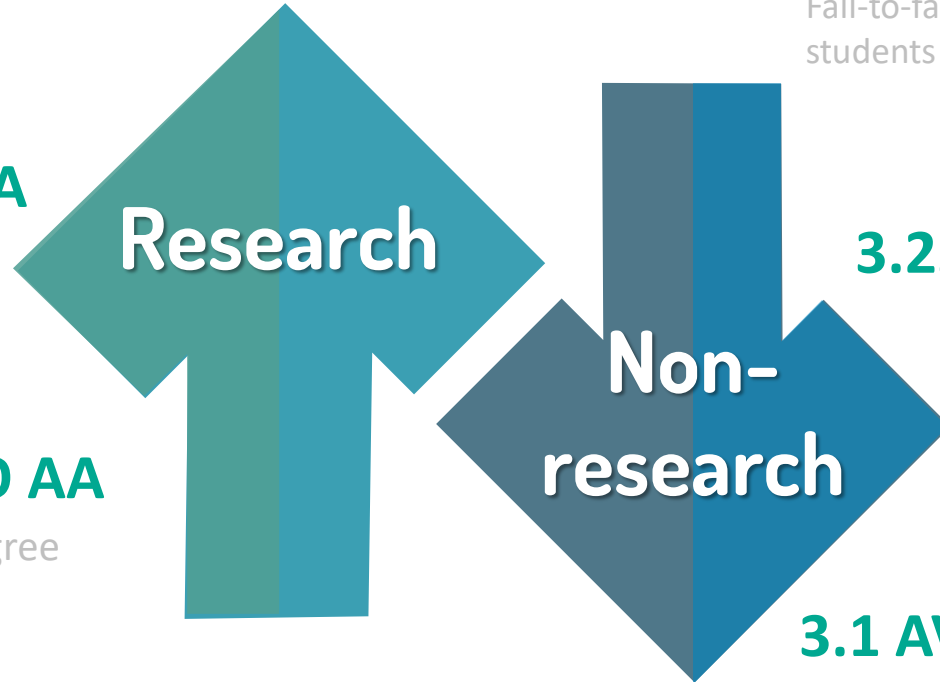
research

2.8 AVG YEARS TO AA

Graduation Rate to AA degree

3.1 AVG YEARS TO AA

Graduation Rate to AA degree



Challenges of Undergraduate Research

Funding

For stipends,
equipment, supplies

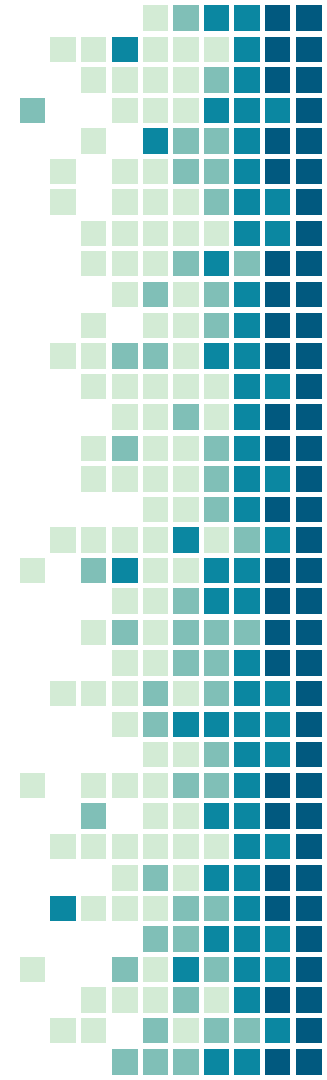
Lack of institutionalization

Faculty Personalities

Faculty engagement at Symposium

Educating administration & faculty on limitations of grants

Faculty-driven project vs. student-focused experience



What's Next



THANKS!

Any questions?

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