

## ***Dr. Milton Dean Slaughter***

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### ***Research Careers for Minority Scholars (RCMS) Program A National Science Foundation Program***

Supported primarily by the National Science Foundation, Xavier University of Louisiana (Principal Investigator—Dr. Murty Akundi) and the University of New Orleans (Principal Investigator—Dr. Milton D. Slaughter) established a ***Research Careers for Minority Scholars*** (RCMS) program. The nationally unique program provided the structural framework for the recruitment of promising high school graduates and enrolled current students to pursue graduate study in **science, technology, engineering, and mathematics** (STEM) and the development of a **Graduate Dual Degree** arrangement between Xavier University (for STEM undergraduate degrees) and the University of New Orleans (for STEM graduate master's degrees). The RCMS program identified selected students and provided them with undergraduate and graduate teaching and research challenges, with experienced undergraduate and graduate faculty members as mentors and research advisors, with help in obtaining summer research internships, and with financial aid in sufficient quantity to facilitate student success. Program unique features were the immersion of students in a quality academic environment conducive to their rapid development as future researchers and providing students with an opportunity to obtain a STEM undergraduate *and* a graduate degree approximately one year earlier than extant traditional approach time-frames through cooperative scheduling of required courses between the participating universities. **Ultimately, the RCMS projected programmatic goal was the increase of the minority pool of STEM doctoral candidates by approximately 20% on a nation-wide basis.**

### ***RCMS Report***

***National Science Foundation Phase-out of the RCMS Program Announced in FY95 in Favor of Programs Similar to the Alliances for Minority Participation Programs at the National Level***

***Xavier University of New Orleans and the University of New Orleans RCMS Unique in the Nation as the Only RCMS Program Geared Toward Bachelor–Masters Degree Attainment***

**National Science Foundation  
FastLane and RCMS Reporting Categories and Questions**

<b>FastLane Reporting Categories &amp; Questions</b>	RCMS Reporting Categories & Questions
<b>Project Participants</b>	
What people have worked on your project?	<b>List project personnel including the Project Director, Co-PDs, Project Manager, Coordinators, Advisory Board members, and members of the Project Steering Committee.</b>  Dr. Milton Slaughter, College of Sciences, University of New Orleans; Dr. Murty Akundi, Physics/Engineering Department, Xavier University of Louisiana

<b>Activities and Findings</b>	
Describe the major research and education activities of the project.	<p><b>One of the key objectives of the RCMS is to improve the quality of undergraduate STEM education through the adaptation and implementation of educational techniques and practices which have been shown to be effective. The major objectives of this RCMS project are to:</b></p> <p>Develop a Graduate Dual Degree (B.S./M.S.) arrangement between the Xavier University of Louisiana and the University of New Orleans in chemistry, computer science, engineering, mathematics, and physics;</p> <p>Recruit a total of 45 talented minority undergraduate students over a period of three years as research scholars in the program;</p> <p>Establish a vigorous undergraduate research environment in the College of Arts and Sciences at Xavier University by providing encouragement and incentive to competent faculty members to develop creative undergraduate research projects;</p> <p>Enrich the undergraduate educational training of participants by involving them in undergraduate research and teaching as an integral part of the program;</p> <p>Organize visitations for area (within a 50 mile radius) high school seniors for research seminars to stimulate their interest in science and engineering;</p> <p>Recruit top ranking high school seniors to major in science or engineering (in part) by instituting a freshman scholarship program; and</p> <p>Supply program support which will orient students to the ethos and demands of graduate level education by providing an academic environment favorable and conducive to the successful transition from the undergraduate to graduate study.</p>

<b>Activities and Findings</b>	
What other organizations have been involved as partners?	<p><b>Identify the science, mathematics, engineering and technology departments, programs and schools that participate in the RCMS project.</b> Students majoring in the following disciplines: chemistry, computer science, dual degree engineering, mathematics, and physics were selected to participate in the program.</p> <p><b>Describe the extent to which members of the STEM and education departments jointly plan, develop and manage RCMS program strategies.</b> Xavier University of Louisiana along with the University of New Orleans, developed course curriculum for the Dual Degree Graduate Program. Departments that are involved included Physics, Engineering, Chemistry, Computer Science, and Mathematics.</p> <p><b>List institutions involved in the project, including other universities, community colleges, school districts, industry, foundations, and National Laboratories.</b> Xavier University of Louisiana (XU) and the University of New Orleans (UNO).</p>
Have you had other collaborations or contacts?	<p><b>Document structured collaborations between the RCMS project and other programs including NSF sponsored programs such as LSLAMP, AGEP, CREST, CCLI and ATE within the awardee institution or within the state or region.</b> In collaboration with the Model Institutions for Excellence Program we conducted colloquia and research mentorship programs. Summer internships were arranged through the E. E. Just Scholars Program for some RCMS participants</p>

<b>Activities and Findings</b>	
	<p><b>Report the extent to which RCMS project activities affect student learning and student access to quality STEM education as defined by the following quantitative student-based outcomes:</b></p> <p>A total of 42 students consisting of freshmen, sophomores, juniors, and seniors in the disciplines of chemistry (9), computer science (6), engineering (16), mathematics (6), and physics (5) have been recruited during the first three years of the program. Out these, ten students have withdrawn for the program and their status is not known.</p> <p>Since the directors were aware of the long-term future of the program, RCMS students were encouraged to apply for other similar programs to accomplish the proposed goals cited in the grant. Nine students are currently in the MIE Program, four in the ONR Future Scientists Program, three in the MARC Program; and four received a private foundation fellowship.</p> <p>Twenty-seven received a bachelor's degree from Xavier University—five of these received a master's degree from UNO, eighteen are currently enrolled in masters and doctoral graduate programs, and four are employed.</p> <p>Three students are currently enrolled in engineering school and two students are enrolled at Xavier.</p> <p>Two UNO courses in mathematical physics for STEM undergraduates were created— which have been very successful in teaching fundamental technical skills.</p>
	<p><b>Report the extent to which plans are developed and implemented to provide faculty development opportunities that engage faculty in the institutional reform effort. Indicators of progress include:</b></p> <p>Sixteen faculty were provided stipends to assist in the enrichment of the undergraduate educational training of participants by involving students as undergraduate research assistants.</p>
Describe outreach activities your project has undertaken.	<p><b>Describe project articulation with the pre-college, Community College and graduate school levels.</b> Students from area high schools attended the STEM colloquia presented by the RCMS participants during the academic year.</p>

<b>Activities and Findings</b>	
<b>Publications, Products, and Contributions</b>	<p><b>List educational materials collected or newly developed as part of the RCMS project.</b></p> <p>M. Akundi, E. Eschenazi, and D. Mclelland, "Thermodynamic properties of molecular species in the upper atmosphere," 2nd Annual National Conference on Diversity in the Scientific and Technological Workforce, October 1993, Washington DC.</p> <p>Strabzewski, K. Rosenborough, "Syntheses of z-chloro-4-flourobenzoic acid z-phenylsulfonyl hydrazide," 2nd Annual National Conference on Diversity in the Scientific and Technological Workforce, October 1993, Washington DC.</p> <p>E. Echenazi and N. Ballard, "Electro chemical oscillations and interface dynamics," 3rd Annual National Conference on Diversity in the Scientific and Technological Workforce, September 1994, Washington DC.</p> <p>A. Jameel and S. Battin, " Animation of natural languages," 3rd Annual National Conference on Diversity in the Scientific and Technological Workforce, September 1994, Washington DC.</p> <p>M. Akundi, S. Davis, C. Collier, A.N. Murty, and G. Lampkin, "Magneto chemical characteristics of Co-Cu-Cr catalysts," 3rd Annual HBCU/Private Sector/DoE Research and Development Technology Transfer Symposium, April 1995, Atlanta GA.</p> <p>M. Giguette, R. Butler, W.J. Dean and A. Lopez, "An implementation of objects and object-oriented programming using PROLOG," NCUR, April 1995.</p> <p>J. Lewis and C. Klein, " Structural determination of 1-Benzenesulfonyl-8-methyl-8 azabicyclo{3.2.1] octane-6-one ethylene ketal-1-carboxylic acid methyl ester," 1996.</p> <p>S. Davis S. Downs, A.N. Murty, G. Lampkin, and M. Akundi, " NMR and magnetic character studies on CO adsorbed syngas catalysts,"</p> <p>C. Collier, S. Downs, and M. Akundi, " Adsorption studies of CO on transition metals by diffuse reflectance FTIR," Louisiana Academy of Sciences, February 1996, Thibodaux LA.</p> <p>G. Lampkin, J. White, A.N. Murty, S. Davis and M. Akundi, " Magneto chemical characteristics of Co-Cu-Cr catalysts," Louisiana Academy of Sciences, February 1996, Thibodaux LA.</p> <p>C. Collier, A. Tsega, A.N. Murty, and M. Akundi, "CO adsorption on cobalt particles supported on chromia – a FTIR study," NCUR 1997, Ashville NC.</p> <p>E. Eschenazi, W. Rayford, and N. Ballard, " Non-linear dynamics of electro chemical oscillations, surface morphology and corrosion." NCUR, April 1997, Austin TX.</p>

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The principal disciplines of the project;	<p><b>What student support and enrichment activities are in place to contribute to the success of the RCMS program?</b> Examples may include: bridge programs, mentorships, internships, support groups.</p> <p><b>Graduate Placement Office</b></p> <p>Students were encouraged to enroll in the GRE workshops conducted by the Office of Graduate Placement. The Office of Graduate Placement provided campus visitations to various schools and bi-monthly workshops to provided information on the importance of graduate study.</p> <p><b>Summer Bridge Programs</b></p> <p>Xavier's Summer Science Academy includes summer bridge programs that high school juniors and seniors and serves as a recruiting tool for the sciences. SOAR (Stress On Analytical Reasoning) 1, SOAR2, SOAR3, and EXCEL, Howard Hughes Biomedical Summer Program, SOAR2 – Phase 2, and SOAR 3 – Phase 2.</p> <p><b>Mentorships</b></p> <p>Xavier University has a strong undergraduate research component, which requires that student spend a minimum of 10 hours per week in a research project mentored by faculty. This provided the needed research exposure and presentations/publications to enhance the student's chances to attend graduate school.</p> <p><b>Summer Internships</b></p> <p>Each STEM faculty provides information about summer internships at various National Labs and Universities and encourages and/or assists students to apply for these opportunities.</p>																																																																
The development of human resources;	<p>Present baseline annual baccalaureate degree production by STEM field and show annual gains in graduation production levels. (Consult the enclosed NSF STEM Classification of Instructional Programs for STEM fields.)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="8" style="text-align: left; padding-bottom: 2px;">STEM Graduates by Discipline and AY (Number of Graduates Attending Graduate/Professional School)</th></tr> <tr> <th></th> <th style="text-align: center; padding-bottom: 2px;"><u>1991-92</u></th> <th style="text-align: center; padding-bottom: 2px;"><u>1992-93</u></th> <th style="text-align: center; padding-bottom: 2px;"><u>1993-94</u></th> <th style="text-align: center; padding-bottom: 2px;"><u>1994-95</u></th> <th style="text-align: center; padding-bottom: 2px;"><u>1995-96</u></th> <th style="text-align: center; padding-bottom: 2px;"><u>1996-97</u></th> <th style="text-align: center; padding-bottom: 2px;"><u>1997-98</u></th> </tr> </thead> <tbody> <tr> <td>Biology</td> <td style="text-align: center;">14 (7)</td> <td style="text-align: center;">22 (13)</td> <td style="text-align: center;">18 (8)</td> <td style="text-align: center;">18 (8)</td> <td style="text-align: center;">24 (13)</td> <td style="text-align: center;">22 (12)</td> <td style="text-align: center;">20 (11)</td> </tr> <tr> <td>Chemistry</td> <td style="text-align: center;">4 (2)</td> <td style="text-align: center;">12 (8)</td> <td style="text-align: center;">7 (3)</td> <td style="text-align: center;">11 (5)</td> <td style="text-align: center;">10 (7)</td> <td style="text-align: center;">12 (6)</td> <td style="text-align: center;">11 (5)</td> </tr> <tr> <td>Computer Science</td> <td style="text-align: center;">5 (1)</td> <td style="text-align: center;">10 (4)</td> <td style="text-align: center;">4 (2)</td> <td style="text-align: center;">9 (2)</td> <td style="text-align: center;">11 (3)</td> <td style="text-align: center;">7 (2)</td> <td style="text-align: center;">11 (2)</td> </tr> <tr> <td>Engineering</td> <td style="text-align: center;">6 (0)</td> <td style="text-align: center;">7 (0)</td> <td style="text-align: center;">6 (0)</td> <td style="text-align: center;">6 (0)</td> <td style="text-align: center;">6 (0)</td> <td style="text-align: center;">4 (0)</td> <td style="text-align: center;">4 (0)</td> </tr> <tr> <td>Mathematics</td> <td style="text-align: center;">3 (2)</td> <td style="text-align: center;">7 (2)</td> <td style="text-align: center;">5 (2)</td> <td style="text-align: center;">7 (3)</td> <td style="text-align: center;">3 (2)</td> <td style="text-align: center;">2 (1)</td> <td style="text-align: center;">4 (3)</td> </tr> <tr> <td>Physics</td> <td style="text-align: center;">5 (1)</td> <td style="text-align: center;">6 (3)</td> <td style="text-align: center;">8 (4)</td> <td style="text-align: center;">12 (7)</td> <td style="text-align: center;">13 (4)</td> <td style="text-align: center;">9 (4)</td> <td style="text-align: center;">10 (4)</td> </tr> </tbody> </table> <p>Note: The number in parenthesis indicates the students in the graduate school. Not included in the data are Science Education, Biology Premed, and Chemistry Premed majors.</p>	STEM Graduates by Discipline and AY (Number of Graduates Attending Graduate/Professional School)									<u>1991-92</u>	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>1995-96</u>	<u>1996-97</u>	<u>1997-98</u>	Biology	14 (7)	22 (13)	18 (8)	18 (8)	24 (13)	22 (12)	20 (11)	Chemistry	4 (2)	12 (8)	7 (3)	11 (5)	10 (7)	12 (6)	11 (5)	Computer Science	5 (1)	10 (4)	4 (2)	9 (2)	11 (3)	7 (2)	11 (2)	Engineering	6 (0)	7 (0)	6 (0)	6 (0)	6 (0)	4 (0)	4 (0)	Mathematics	3 (2)	7 (2)	5 (2)	7 (3)	3 (2)	2 (1)	4 (3)	Physics	5 (1)	6 (3)	8 (4)	12 (7)	13 (4)	9 (4)	10 (4)
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