

Graduate Council Minutes

2-22-10

Present: Drs. Sustich, Holman, Traylor, Owen, Miao, McDaniel, Christenberry, Jones,  
Chiavacci, Risch and Ms. Finch

Proxy: Zeng for Amienyi

Guests: Drs. Ron Johnson, George Foldesy

1. Science and Mathematics

New Course – BIO 6196 Internship in Biotechnology – **approved**

New Program – Professional Science Masters in Biotechnology – **approved**

2. Education

New Program – PhD in Educational Leadership - **approved**

**New/Special Course Proposal-Bulletin Change Transmittal Form** **Undergraduate Curriculum Council** - Print 1 copy for signatures and save 1 electronic copy. **Graduate Council** - 14 copies plus 1 original **New Course** or  **Special Course (Check one box)**

Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.

Department Curriculum Committee Chair	Date	COPE Chair (if applicable)	Date
Department Chair	Date	General Education Committee Chair (if applicable)	Date
College Curriculum Committee Chair	Date	Undergraduate Curriculum Council Chair	Date
College Dean	Date	Graduate Curriculum Committee Chair	Date
		Vice Chancellor for Academic Affairs	Date

<b>1. Proposed Course Prefix and Number (For variable credit courses, indicate variable range.)</b> BIO 6196
<b>2. Course Title – if title is more than 30 character (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).</b> Internship in Biotechnology
<b>3. Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio problems, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.</b> Practicum
<b>4. What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental)?</b> Standard Letter
<b>5. Is this course dual listed (undergraduate/graduate)?</b> No
<b>6. Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)</b> No
<b>7. Brief course description (40 words or less) as it should appear in the bulletin.</b> Participation in an internship on a volunteer or paid basis with a private business, research center or public agency in the field of biotechnology. Study of methods and applications of molecular tools.
<b>8. Indicate all prerequisites and if this course is restricted to a specific major, which major. (If a student does not have the prerequisites or does not have the appropriate major, they will not be allowed to register).</b> BIO 6144, BIO 6154
<b>9. Course frequency (e.g. Fall, Spring, Summer, or Demand). Not applicable to Graduate courses.</b> N/A
<b>10. Contact Person (Name, Name of Institution, Address, Email Address, Phone Number)</b> Ronald Johnson

Arkansas State University  
 Dept. of Biological Sciences  
 P.O.Box 599  
 State University  
 AR 72467  
 rlj@astate.edu  
 (870) 972-2366

**11. Proposed Starting Term/Year**

Fall 2010

**12. Is this course in support of a new program? If yes, what program?**

Yes, MS Biotechnology

**13. Does this course replace a course being deleted?**

No

b. If yes, what course?

c. Has this course number been used in the past? No

Attach Course Deletion Proposal-Bulletin Change Transmittal Form.

**14. Does this course affect another program? If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.**

No

**15. Justification should include:****A. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain).**

1. **ACADEMIC RATIONALE** There is an increasing need for professionals trained in the specific laboratory skills required for employment by molecular biology and biotechnology intensive companies and government entities (e.g., law enforcement). Few programs exist nationally to supply the need for these professionals, and none in Arkansas. This practicum provides extensive development of tools learned in the classroom. Application of those tools in research, industry or government will prove invaluable to student career development.

2. **GOALS OF THE COURSE:** Upon completing this course students should be able to:

- Demonstrate good laboratory practice
- Demonstrate mastery of a series of laboratory techniques and trouble shoot
- Maintain an effective laboratory journal
- Effectively write a manuscript for publication

**B. How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.**

This course fits well with the goals of Department of Biological Sciences as the "Department's graduate program embraces a broad range of topics from global to local, from general to specific and from highly interdisciplinary to very particular" (<http://biology.astate.edu/ProspectGrad.htm>)  
 The emphasis area in the Biology Masters degree requires 28 hours of selectives. This is one of those selective courses.

**C. Student population served.**

Graduate students of the Biotechnology program

**D. Rationale for the level of the course (lower, upper, or graduate)**

Students entering the field of biotechnology require a solid foundation of the techniques of the field. The diverse tools and technology involved in Biotechnology require a mature approach to the understanding of the subject. This internship provides real world job training. Hence graduate students will benefit maximally from this course.

**17. Course requirements (e.g. research papers, projects, interviews, tests, etc.)**

Students will be required to maintain a daily journal which must be submitted with approval by the supervising

agency. All students will be required to complete a detailed synthesis paper covering methods and applications of molecular tools used during this internship.

**18. Special features** (e.g. labs, exhibits, site visitations, etc.)

This internship is a laboratory intensive course.

**19. Required reading**

Text Book: None

**20. Department staffing and classroom/lab resources** (Will this require additional faculty, supplies, etc.?)

This course will be mentored by the research/industry group hosting the internship. Additionally, the Instructor/Director of the PSM Biotechnology program will contact participating institutions and coordinate the placement of each student. There will be no additional costs to the University.

**21. What is the primary goal of this course?**

This internship is designed to provide students the laboratory skills and principles both to succeed in the short term in the research/job setting and to adapt to ongoing technological changes. Contacts made within this program may assist in future job placement.

**22. If this proposal is for a general education course, please check the primary goal this course addresses:**

- |   |   |
|---|---|
| <input type="checkbox"/> Communicating effectively                                      | <input type="checkbox"/> Thinking Critically  |
| <input type="checkbox"/> Using mathematics  | <input type="checkbox"/> Using Technology   |
| <input type="checkbox"/> Understanding global issues                                    | <input type="checkbox"/> Understanding interdependence                                  |
| <input type="checkbox"/> Developing a life-long appreciation of the arts and humanities | <input type="checkbox"/> Developing a strong foundation in the social sciences          |
| <input type="checkbox"/> Using science to accomplish common goals                       | <input type="checkbox"/> Providing foundations necessary to achieve health and wellness |

**23. Considering the indicated primary goal, provide up to three outcomes that you expect of students after completion of this course. For example, what will students who meet this goal know or be able to do as a result of this course?**

**Primary Goal Outcome #1:**

Students should have extensive knowledge within the field of Applied Biotechnology, the knowledge of biological macromolecules structure and function and be able to use this knowledge in both research and development work. Students should also develop the theoretical and practical knowledge of how biotechnological projects are planned, controlled and completed

**Learning Activity:** (For example, what instructional processes do you plan to use to help students reach this outcome?)

This internship will be intensive over the 8 week fall semester to immerse the students in the skills required to reach the outcomes above.

**Assessment Tool:** (For example, what will students demonstrate, represent, or produce to provide evidence of their learning?)

The employer will provide a written evaluation of the intern's performance to the Program Director at the end of the program. Students will be required to maintain a daily journal which must be submitted with approval by the supervising agency. A written synthesis paper that conforms to accepted University format will be written by the student in consultation with the student's graduate committee and mentor, and then reviewed and approved by that same committee. Due to the sensitive and proprietary nature of research in agencies, business and industry, the content of the synthesis paper will be a discussion of the tools and applications used within the internship program and broadened to a discussion of wider applications of those same tools industry-wide.

(Repeat if needed for additional outcomes 2 and 3.)

**From the most current electronic version of the bulletin, copy all bulletin pages that this proposal affects and paste it to the end of this proposal.**

**To copy from the bulletin:**

1. Minimize this form.
2. Go to <http://registrar.astate.edu/bulletin.htm> and choose either undergraduate or graduate.
3. This will take you to a list of the bulletins by year, please open the most current bulletin.
4. Find the page(s) you wish to copy, click on the "select" button and highlight the pages you want to copy.
5. Right-click on the highlighted area.
6. Click on "copy".
7. Minimize the bulletin and maximize this page.
8. Right-click immediately below this area and choose "paste".
9. For additions to the bulletin, please change font color and make the font size larger than the surrounding text. Make it noticeable.
10. For deletions, strike through the text, change the font color, and enlarge the font size. Make it noticeable.

**BIO 6003 Scientific Methods and Research Design** A focus on the understanding and development of the scientific method as it pertains to research. Required of the graduate life sciences major, including students studying within the Biology, Botany, Wildlife Management and Zoology emphasis.

**BIO 6006 Internship in Biotechnology** Participation in an internship with a private business, research center or public agency in the field of biotechnology. Included is a minimum of 300 work hours. Internship may be a volunteer or paid position. Included is the completion and approval of a synthesis paper covering methods and applications of molecular tools used during this internship.

**BIO 6013 Biosafety and Ethics in Research** Biosafety in the workplace, including chemical and radiation safety. Examination of moral and ethical issues in the laboratory and in research, including the concepts of transgenics, intellectual property and writing in research. Lecture three hours per week.

**BIO 6103 Genetic Engineering** An introduction to genetic engineering through an overview of the types of experiments that recombinant DNA makes possible, and an explanation of the information that such experiments have revealed. Lecture three hours per week.

**BIO 6113 Advanced Cell Biology** Study of recent advances in cell biology through critical analysis of current literature. Focusing on eukaryotic cell structure and function, topics may include, but not be restricted to, cellular structures and organelles; cell cycling; signal transduction; gene regulation; and intracellular trafficking Prerequisites: A course in cell biology or permission of the professor

**BIO 6013 Evolutionary Biology** A summary of current theories concerned with evolution of biological organisms. An elective course particularly directed to the needs of biological science majors including students of Biology, Botany, Zoology, and Wildlife Management. (Fall of even years)

**BIO 6123 Specialized Biochemistry** An advanced study of biochemical pathways leading to specialized biologically active metabolites. Emphasis will be on specialized pathways in plants. and their counterparts in animals, and microorganisms.

**BIO 6141 Introduction to Biotechnology** An introduction to the applications, industries and tools of biotechnology, including medicine, pharmaceuticals, industry and agriculture. Lecture one hour per week.

**BIO 6144 Laboratory in BioTechniques I** Laboratory techniques in protein chemistry and analysis, cell culture, and DNA/RNA isolation techniques. Techniques also include a variety of chromatographic methods, electrophoresis, UV-vis spectroscopy and radiochemistry. (Course fee, \$100.)

**BIO 6154 Laboratory in BioTechniques II** Laboratory techniques in DNA/RNA analysis and applications,

Revised 9/25/2006

including PCR, real-time PCR, recombinant DNA and the production of gene expression products. (Course fee, \$100.)

**BIO 6301 Aquatic Biology** The collection, identification, and study of aquatic invertebrate and vertebrate animals with emphasis on life history, ecology, and importance to man. Lecture one hour per week. Prerequisites: BIO 1503, 1501, 1303, 1301.

**BIO 6302 Laboratory for Aquatic Biology** Four hours per week. To be taken concurrently with BIO 6301. (Course fee, \$20)

For Registrar's Use only

Code #

### New Program/Certificate Proposal-Bulletin Change Transmittal Form

Undergraduate Curriculum Council - Print 1 copy for signatures and save 1 electronic copy.

Graduate Council - Print 1 copy for signatures and send 1 electronic copy to [mmcginnis@astate.edu](mailto:mmcginnis@astate.edu)

**New Certificate or Degree Program** (The following critical elements are taken directly from the Arkansas Department of Higher Education's "Criteria and Procedures for Preparing Proposals for New Programs".) Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.

Department Curriculum Committee Chair

Date

COPE Chair (if applicable)

Date

Department Chair

Date

General Education Committee Chair (if applicable)

Date

College Curriculum Committee Chair

Date

Undergraduate Curriculum Council Chair

Date

College Dean

Date

Graduate Curriculum Committee Chair

Date

Vice Chancellor for Academic Affairs & Research

Date

**PROPOSAL – 1**  
**NEW CERTIFICATE OR DEGREE PROGRAM**

1. **PROPOSED PROGRAM TITLE:** PROFESSIONAL SCIENCE MASTERS IN BIOTECHNOLOGY

2. **CIP CODE REQUESTED:** 26.0101

3. **CONTACT PERSON**

Name	Dr. Stanley Trauth, Chair
Name of Institution	Arkansas State University
Address:	Department of Biological Sciences, College of Science and Mathematics Arkansas State University, P.O. Box 599, State University, AR 72467
E-mail Address	strauth@astate.edu
Phone Number	870.972.3982

4. **PROPOSED STARTING DATE** August 15, 2010

5. **PROGRAM SUMMARY**

Biotechnology training is fundamental to many careers in today's knowledge-based economy and focuses on the interfaces among applied biology, bioinformatics, chemistry, agriculture, and medicine. There is an increasing need for professionals to be trained in necessary laboratory skills required for employment by molecular biology and biotechnology intensive companies. According to the most recent U.S. Department of Labor statistics, there will be a projected increase of 20-35% in the demand for advanced degree positions in the agricultural and biopharmaceutical industries over the next 10 years. Arkansas State University-Jonesboro (ASU) is uniquely located and positioned to promote economic development in biotechnology industries in northeast Arkansas and the lower Mississippi Delta. Partnering with business, industry, and government agencies, this program addresses the growing demand for a highly skilled biotechnology workforce. The Professional Science Masters Biotechnology (PSM-Biotechnology) program is designed as a terminal master's degree, integrating classroom instruction stressing concepts and theory with an intensive laboratory experience focused on techniques and acquisition of hands-on skills required by a professional biotechnologist. Last year Arkansas State University developed the M.S. Biology, Biotechnology emphasis, as an intermediate step for the implementation of this program.

The **goals of the program** are to: ensure students master the theoretical concepts and technical skills needed by the linked disciplines of chemistry, biology, and agriculture; foster a team approach to performing research; place students in an internship in which the skills they have acquired through the PSM-Biotechnology program are demonstrated at a work place and their skill set is enhanced and expanded; and ensure students compete successfully for quality technical and/or research positions in Academia, industry and government.

**Curriculum Additions and Modifications:** The singular curriculum addition for this program over the existing and approved M.S. Biology, Biotechnology emphasis, is the creation of a new course, BIO 6006 Internship in Biotechnology. Each student will be required to complete a 300 hour internship, which will take place during the fall semester of the second year (the final semester of the program). Students will be placed at one of several research institutions or agencies where research may or may not be the focus of that

experience. Some of the institutions involved with this program are applications-based rather than research-based. Placement will be determined by the student, Program Director and affiliated institution. Several businesses and agencies have been contacted and have committed their support to housing interns during this period (see support letters in Appendix A). This group of mentoring institutions includes the Dale Bumpers National Rice Research Center in Stuttgart, AR, Rice Research and Extension Center in Stuttgart, AR, the National Center for Toxicology Research in Jefferson, AR, the Arkansas State Crime Lab in Little Rock, AR, the Arkansas Biosciences Institute (ABI) in Jonesboro, AR, St. Jude Children's Hospital in Memphis, TN, and Transnetyx, Inc. in Cordova, TN.

**Existing degree programs that support the proposed program:** Several programs interface well with this proposed program. The proposed program complements a recently developed interdisciplinary Ph. D. program in Molecular Biosciences (MBS), initiated in 2005, and the ABI, created as the major research component of the Tobacco Settlement Proceeds Act of 2000, with on-campus construction completed in 2003. The MBS Ph.D. program currently has 17 students. The PSM- Biotechnology program is designed to support economic development in northeast Arkansas through knowledge-based industry development arising out of the ABI, MBS and related programs at ASU. Similar to the Ph.D. program, this will be an interdisciplinary program integrating the knowledge and technical skills of several disciplines. ASU has success in developing graduate interdisciplinary programs, such as the doctoral programs for Molecular Biosciences, Environmental Sciences, and for Heritage Studies; the policy models used for those successful programs will be adapted to the PSM- Biotechnology program. Both the PSM- Biotechnology and Ph. D. programs are in concert with the state's ABI mandate and funding and are a logical extension of recent ASU faculty recruitment with an increased focus on cellular and molecular biology.

Other graduate programs which will interact with and support the proposed program include the Environmental Sciences Ph.D. and M.S. programs, the M.S. Biology and M.A. Biology programs, and the M.S. program in Chemistry. Research and teaching strengths of faculty associated with these programs will provide a framework from which this proposed program will grow. Undergraduate programs will also serve as a source of students for this program.

## 6. NEED FOR THE PROGRAM

There is an increasing need for professionals to be trained in necessary laboratory skills required for employment by molecular biology and biotechnology intensive companies. According to the most recent U.S. Department of Labor statistics ([www.bls.gov](http://www.bls.gov)), there will be a projected increase of 20-35% in the demand for advanced degree positions in the agricultural and biopharmaceutical industries over the next 10 years. This demand is supported by additional statistics indicating a projected 20% increase in salaries for these positions over the same time period. Further, a survey of international biopharmaceutical manufacturing companies revealed that within five years more than half will experience shortages in personnel ([www.bioplanassociates.com](http://www.bioplanassociates.com)). A. Mohanty, Vice President for Manufacturing of Transkaryotic Therapy was quoted as stating "What's needed is for the top-notch traditional universities to offer biotechnology programs that will generate graduates with excellent application and technical skills at the master's level".

Few programs exist nationally to supply the need for these professionals, and there are no programs in Arkansas. The institution closest to ASU that offers a program similar to the one we propose is greater than 300 miles in distance (Middle Tennessee State University). The strong agricultural base of our region and local research makes our program and market unique. ASU has already experienced a high student demand for a biotechnology program. For example, in the past year ASU received ~ 50 applications for the Masters degree in Biology, with most candidates having a strong background in molecular biology. Qualified locally trained American employees

are in high demand. For example, of 24 researchers and technicians in the Arkansas Biosciences Institute (ABI) facility on our campus, 14 are of international descent. To further illustrate this shortage of American professionals, in a recent post-doctoral search, out of 10 applicants none were from the United States. In an economic period of declining American employment, biotechnology-related jobs represent a growth industry.

To ensure the proposed PSM-Biotechnology program is aligned with the needs of employers and the students get the real-world work experience, the project team has collaborated with several industries and agencies to shape the proposed curriculum, including Alberto Culver, Nestles, Syngenta, ASU Arkansas Biosciences Institute (ABI), Arkansas State Crime Laboratory, National Center of Toxicology and Research, Dale Bumpers Federal Rice Research Center and St. Jude’s Children’s Hospital. Further, several businesses and agencies have been contacted and have committed their support to housing interns (see support letters in Appendix A). This group of mentoring institutions includes the Dale Bumpers National Rice Research Center in Stuttgart, AR, Rice Research and Extension Center in Stuttgart, AR, Monsanto Corporation in St. Louis, MO, the National Center for Toxicology Research in Jefferson, AR, the Arkansas State Crime Lab in Little Rock, AR, the Arkansas Biosciences Institute in Jonesboro, AR, St. Jude Children’s Hospital in Memphis, TN, and Transnetyx, Inc. in Cordova, TN. Each intern will have a manager assigned to mentor him or her at the supervising institution.

## 7. CURRICULUM OUTLINE

**Admission Requirements:** Each applicant must have a minimum of a B.S. in a basic or applied science, with a minimum undergraduate grade point average of 2.75. Applicants must present Graduate Record Examination scores for the Verbal, Analytical and Quantitative tests. The minimum combined Verbal and Quantitative scores must be 1000. TOEFL scores will be required for international applicants, with a minimum IBT score of 79.

**Program of Study:** All candidates for the PSM- Biotechnology degree will be required to complete the core and elective courses, or their equivalent, as directed by the Program Director. The Director may alter or require additional academic work as he/she deems appropriate.

The curriculum will include 36 academic credits over 4 semesters (Fall, Spring, Summer, Fall), including two intensive 3- hour laboratory methods courses and a 300 hour internship with an industry or agency. Internships will be focused on intensive training and application of skills acquired in technique laboratories. A written synthesis paper will be completed, focusing on the incorporation of tools to solve scientific problems rather than a traditional research thesis (discussed earlier). A written comprehensive exam will be successfully completed during the Fall semester of year 2 of the program. Core courses will be required of all graduate students. Elective courses may be tailored to the individual needs and career goals of the student, with foci available in bioinformatics, molecular biology, quality assurance/quality control, policy, or business. Table 1 provides an outline of required core courses and available electives.

**Table 1: Core and Elective Courses for the PSM-Biotechnology Degree**

Required Courses: 28 Credit Hours		
Course Number	Name	Credit Hours
BIO 6141	Introduction to Biotechnology	1
BIO 6033	Biosafety and Ethics in Research	3
BIO 6144	Laboratory in BioTechniques I	4
BIO 6154	Laboratory in BioTechniques II	4
MBS 6243	Molecular Genetics and Genomics	3

BIO 6133	Bioinformatics and Applications	3
MBS 6001	Fundamentals of Entrepreneurship for Scientists	1
MGMT 6433	Entrepreneurship	3
BIO 6006	Internship in Biotechnology	6
<b>Elective Courses: 8 Credit Hours</b>		
MBS 6213	Advanced Cell Biology	3
BIO 5013	Population Genetics	3
BIO 5103	Virology	3
BIO 5113/5111	Immunology and Lab	4
BIO 5123	Cell Signaling	3
BIO 5133/5131	Cell Biology and Lab	4
BIO 5143	Pharmacology	3
BIO 6023	Genetic Engineering	3
BIO 6233	Specialized Biochemistry	3
BIO 5123/5211	Human Genetics and Lab	4
BIO 6543	Cell & Molecular Neurobiology	3
BIO 6702	Endocrinology	2
BIO 5611	Radiation Safety	1
BIO 5104	Microbiology	4
BIO 5001/5003	Lab Techniques in Microscopy and Lab	4
STAT 5463	Probability and Statistics II	3
STAT 6623	Statistical Methods with SAS Programming	3
STAT 6643	Multivariate Analysis	3
MGMT 6443	Management Development Strategies	3
MGMT 6453	Seminar in Contemporary Management Issues	3
MGMT 6793	Business Ethics and Social Responsibility	3
MKTG 6223	Strategic Marketing	3
TECH 5823	Quality Assurance	3

**Required course descriptions:** The following required courses (credit hours) have previously been approved by curriculum committees at the departmental, college, and university levels.

**BIO 6141 Introduction to Biotechnology (1)**

An introduction to the applications, industries and tools of biotechnology, including medicine, pharmaceuticals, industry and agriculture. Lecture one hour per week.

**BIO 6033 Biosafety and Ethics in Research (3)**

Biosafety in the workplace, including chemical and radiation safety. Examination of moral and ethical issues in the laboratory and in research, including the concepts of transgenics, intellectual property and writing in research. Lecture three hours per week.

**BIO 6144 Laboratory in BioTechniques I (4)**

Laboratory techniques in protein chemistry and analysis, cell culture, and DNA/RNA isolation techniques. Techniques also include a variety of chromatographic methods, electrophoresis, UV-vis spectroscopy and radiochemistry. Summer I.

**BIO 6154 Laboratory in BioTechniques II (4)**

Laboratory techniques in DNA/RNA analysis and applications, including PCR, real-time PCR, recombinant DNA and the production of gene expression products. Summer II.

**BIO 6133 Bioinformatics and Applications (3)**

Provides a basic understanding of computational methods used in bioinformatics, including

hands on training to access and use biological data sources to analyze nucleotide amino acid sequences and three dimensional atomic structures of proteins, nucleic acids allowing interpretations of biological processes. Lecture three hours per week.

### **MBS 6001 Fundamentals of Entrepreneurship for Scientists (1)**

Entrepreneurship from discovery through protected intellectual property. Information about the fundamental processes required to protect new inventions. Including definitions of intellectual property, necessary record keeping, disclosure options for protecting IP and patent application process. Lecture one hour per week.

### **MBS 6243 Molecular Genetics and Genomics (3)**

An advanced treatment of genetics in microbial, animal, and plant systems, focused on the biochemical and molecular aspects of genetic structure and function. Information derived from current and recent genomic analyses and genomic comparisons will be included. Lecture three hours per week.

### **MGMT 6433 Entrepreneurship (3)**

Explores the nature of entrepreneurial activity, the basics of business plan development, new ventures creation, and small business strategic planning. Lecture three hours per week.

The following required course is has been submitted for approval through the university curriculum process.

### **BIO 6006 Internship in Biotechnology (6)**

Participation in an internship with a private business, research center or public agency in the field of biotechnology. Included is a minimum of 300 work hours. Internship may be a volunteer or paid position. Included is the completion and approval of a synthesis paper covering methods and applications of molecular tools used during this internship.

Proposed curriculum structure for the four-semester program:

#### **Fall semester, Year 1**

BIO 6141 Introduction to Biotechnology (1)  
BIO 6033 Biosafety and Ethics in Research (3)  
BIO 6133 Bioinformatics and Applications (3)  
MBS 6001 Fundamentals of Entrepreneurship for Scientists (1)  
Elective

#### **Spring semester, Year 1**

MBS 6243 Molecular Genetics and Genomics (3)  
MGMT 6433 Entrepreneurship (3)  
Elective  
Elective

#### **Summer semester, Year 1**

BIO 6144 Laboratory in BioTechniques I (4)  
BIO 6154 Laboratory in BioTechniques II (4)

#### **Fall semester, Year 2**

BIO 6006 Internship in Biotechnology (6)

**Research Experience:** Student research within the PSM-Biotechnology program will be performed during the intensive summer training courses with the potential of additional research during the internship the following semester. A critical component of the summer tools development courses in Year 1 (BioTechniques I and II; 5 weeks each) is that students will be

working in teams of four to complete a research project, which will be written up and presented at the end of the summer. Additionally, each research team will be assigned a mentor from the faculty of ASU (researchers of ABI are joint-appointed as faculty). Team-building is an important component of the scientific enterprise (Salas et al. 1999; Barab and Leuhmann 2003); this experience will provide the integration of research and socialization required of successful productivity. Through previous summer internships, ASU science faculty and researchers have extensive experience with mentoring students. For example, ASU faculty have been associated with several undergraduate research mentoring programs, such as Research in Science of the Environment (RISE; since 2002), Accelerated RISE programs (since 2008), Undergraduate Research and Mentoring in the Biological Sciences (URM; since 2007), Arkansas Lewis Stokes Advancing Minority Participation Grant (ARK-LSAMP; since 2009) and Student Undergraduate Research Fellowships (SURF; for more than 15 years). Mentoring for the PSM-Biotechnology program will be an extension of our faculty's experience with previous undergraduate and graduate mentoring programs.

**Internship Experience:** The internship will take place during the fall semester of the second year. Students will be placed at one of several research institutions or agencies where research may or may not be the focus of that experience. Some of the institutions involved within with this program are applications-based rather than research-based. Placement will be determined by the student, Program Director and affiliated institution. Several businesses and agencies have been contacted and have committed their support to housing interns during this period (see support letters). This group of mentoring institutions includes the Dale Bumpers National Rice Research Center in Stuttgart, AR, Rice Research and Extension Center in Stuttgart, AR, Monsanto Corporation in St. Louis, MO, the National Center for Toxicology Research in Jefferson, AR, the Arkansas State Crime Lab in Little Rock, AR, the Arkansas Biosciences Institute in Jonesboro, AR, St. Jude Children's Hospital in Memphis, TN, and Transnetyx, Inc. in Cordova, TN. Each intern will have a manager assigned to mentor him or her at the supervising institution. The employer will provide a written evaluation of the intern's performance to the Program Director at the end of the program. Students will be required to maintain a daily journal which must be submitted with approval by the supervising agency. A written synthesis paper that conforms to accepted University format will be written by the student in consultation with the student's graduate committee and mentor, and then reviewed and approved by that same committee. Due to the sensitive and proprietary nature of research in agencies, business and industry, the content of the synthesis paper will be a discussion of the tools and applications used within the internship program and broadened to a discussion of wider applications of those same tools industry-wide.

The **goals of the program** are to: ensure students master the theoretical concepts and technical skills needed by the linked disciplines of chemistry, biology, and agriculture; foster a team approach to performing research; place students in an internship in which the skills they have acquired through the PSM-Biotechnology program are demonstrated and their skill set is enhanced and expanded; and ensure students compete successfully for quality technical and/or research positions in Academia, industry and government.

Goal 1: Ensure students master the theoretical concepts and technical skills needed by the linked disciplines of chemistry, biology, and agriculture.

Goal 1 Objectives:

- All students will successfully complete an interdisciplinary core curriculum and complementary elective courses.
- All students will participate in an intensive summer research experience.
- All students will be placed in a biotechnology internship.

Goal 1 Performance Measures:

- Count the number of students who successfully complete the first year of the program.
- Count the number of students who successfully complete the full program.
- Examine the scores and comments on students' comprehensive exams.

- Monitor student grades (as a measure of achievement).
- Monitor course effectiveness using student evaluations both during their time in the program and after they have graduated from the program. Goal 2: Foster a team approach to performing research.

Goal 2 Objectives:

- All students will participate in an intensive summer research experience.
- All students will be assigned a research mentor and be placed on a research team.
- All students will present research results with their team at the end of the summer term.

Goal 2 Performance Measures:

- Monitor student-mentor research collaborations via research logs and interviews with students and mentors.
- Survey students and their mentors following the summer BioTechniques I and II courses to determine their perceptions of the effectiveness of group-based research.
- Examine the scores and results of final research presentations by the research teams following the BioTechniques I and II courses.

Goal 3: Place students in an internship in which the skills they have acquired through the PSM-Biotechnology program are demonstrated and their skill set is enhanced and expanded.

Goal 3 Objectives:

- Partnerships are built and maintained with more than 10 biotechnology industries or agencies.
- All students will be placed in a biotechnology internship.
- All students will be assigned a supervisor to assess performance and skill development.

Goal 3 Performance Measures:

- Monitor the placement of interns in cooperative institutions.
- Monitor supervisor assessments of the internship (Supervisors will assess students using a tool that measures the quality of student performance, using the following domains: work competence, knowledge of subject area, skills, motivation and interest in the profession, perseverance, judgment, interpersonal skills, reliability, resourcefulness, communication skills and productivity).
- Monitor successful completion of synthesis papers, as determined by the graduate committee.

Goal 4: Ensure students compete successfully for quality technical and/or research positions in Academia, industry and government.

Goal 4 Objectives:

- All students will participate in career development activities (e.g., seminars, career fairs with industries, and career counseling).
- All of program graduates will be placed in a technical or research position within six months of graduation.

Goal 4 Performance Measures:

- Maintain record of career development activities offered and student attendance records.
- Monitor the employment of students upon graduation from ASU using methods such as Facebook and e-mail correspondence.
- Monitor the advancement of students in industry (e.g., through email).
- Compare salaries of PSM-Biotechnology program graduates to regional and national averages.

**Student Evaluation:** Grading for courses will be based upon performance in exams, demonstration of laboratory skills, completion of written assignments and classroom participation. Criteria used will be course-specific.

Assessment of internships will be ongoing. Each intern will have a manager assigned to mentor him or her at the supervising institution. The employer will provide a written evaluation of the intern's performance to the Program Director at the end of the program. Students will be required

to maintain a daily journal which must be submitted with approval by the supervising agency. A written synthesis paper that conforms to accepted University format will be written by the student in consultation with the student's graduate committee and mentor, and then it will be reviewed and approved by that same committee. Due to the sensitive and proprietary nature of research in agencies, business and industry, the content of the synthesis paper will be a discussion of the tools and applications used within the internship program and broadened to a discussion of wider applications of those same tools industry-wide.

Graduate students will select a graduate committee during their first or second semester at ASU. The committee will be chaired by the student's faculty supervisor, and should be composed of at least two additional ASU graduate faculty, whom should be associated with the Biotechnology program (e.g., faculty in the Biological Science, Chemistry and Physics, Mathematics and Statistics, and Agriculture departments). The student's committee is responsible for working with the student to develop an appropriate degree plan, reviewing periodically the progress toward completion, supervising the writing of a synthesis paper and the administering of written comprehensive exams. Students must maintain a grade of B or better in their graduate courses to remain in the program. Students will be counseled by the Program Director in the area(s) in which they need improvement. A copy of the course evaluation to be completed by students is included as Appendix B.

## 8. FACULTY

List the names and credentials of all current faculty in the proposed program.

Buchanan, Roger A., Ph.D. (University of Delaware), Director of Molecular Biosciences Ph.D. Program, Professor of Zoology  
Choi, Seo-eun, Ph.D. (Florida State University), Assistant Professor of Mathematics and Statistics  
Cramer, Carole , Ph.D. (University of California - Irvine) Professor of Biology and Agriculture, Executive Director ABI – ASU  
Gilmore, David F., Ph.D. (University of Connecticut), Assistant Professor of Environmental Biology  
Grippio, Anne A., Ph.D. (University of North Carolina–Chapel Hill), Associate Professor of Biology  
Grippio, Richard S., Ph.D. (The Pennsylvania State University), Professor of Environmental Biology  
Hood, Elizabeth, Ph.D. (Washington University), Lipscomb Distinguished Scholar, College of Agriculture  
Ingram, Debra, Ph.D. (University of Memphis), Associate Professor of Mathematics and Statistics  
Johnson, Ronald L., D.A. (University of Northern Colorado), Professor of Zoology, – Assistant Chair, Department of Biological Sciences  
Lorence, Argelia, Ph.D. (Universidad Nacional Autónoma de México), Associate Professor in Metabolic Engineering, Arkansas Biosciences Institute and Department of Chemistry and Physics  
Medina-Bolivar, Fabricio, Ph.D. (Pennsylvania State University), Assistant Professor in Metabolic Engineering, Arkansas Biosciences Institute and Department of Biological Sciences  
Srivatsan, Malathi, Ph.D. (All India Institute of Medical Sciences), Associate Professor of Biology  
Trauth, Stanley E., Ph.D. (Auburn University), Professor of Zoology, Chair, Biology Department  
Tunno, Oscar F., Ph.D. (Clemson University), Assistant Professor of Mathematics and Statistics  
Xu, Jianfeng, Ph.D. (Dalian University of Technology), Assistant Professor in Arkansas Biosciences Institute and College of Agriculture & Technology  
Yu, Shiguang, Ph.D. (Shandong University), Assistant Professor of Arkansas Biosciences Institute and Department of Biological Sciences  
Zhou, Hong, Ph.D. (University of Memphis), Assistant Professor of Mathematics and Statistics

Please see attached CVs in Appendix C for teaching faculty.

**New Faculty Line: Program Director/Instructor**, Department of Biological Sciences.  
Role: The Program Director will coordinate all administrative aspects of the program on a daily basis, including student recruitment, admissions, retention, committee activities, faculty coordination in instruction and internships, curriculum, assignment of graduate assistant awards, and course instruction. Instructional duties include the teaching of the two Biotechniques lab courses, which will be offered every summer, and the “Introduction to Biotechnology” and “Biosafety and Ethics in Research” courses, which will be offered annually. The newly hired faculty member will have a minimum of a Master’s degree in biotechnology, molecular biology, biochemistry, or chemistry, with a strong background in the techniques used in biotechnology and molecular biology. Position to commence July 1, 2010.

## 9. DESCRIPTION OF RESOURCES

**Faculty Resources:** This will be an interdisciplinary program, drawing on the strengths of faculty across several departments and colleges. Existing courses supporting other programs will provide the framework of this program. Faculty involved in this program have a commitment to staying current within their disciplines (see attached CVs and #8 above).

**Library Resources:** Existing library resources have been supporting ongoing MS programs in biology, agriculture and chemistry in addition to Ph.D. programs in Environmental Sciences and Molecular Biosciences.

A keyword search of the Dean B. Ellis Library catalog using the word *biotechnology* returns 211 book titles, with 37 of those titles being e-books. Of those 211 titles, 53 were published within the last 3 years, and 128 were published within the last 10 years. Broader keyword searches for *biology*, *agriculture*, and *chemistry* return in excess of 3,000 title hits each, with approximately 10% of the titles in each subject area having been published within the last 3 years.

The Dean B. Ellis Library has subscription based access to several thousand current journals and periodicals, with hundreds of these journals having possible subject-specific relevancy to students in a Professional Science Masters in Biotechnology.

The Library currently subscribes to more than 100 online databases covering all academic disciplines. In addition to major full-text databases with relevancy for all graduate students, such as *Dissertations & Theses full-text (formerly Dissertation Abstracts)* and *LexisNexis Academic*, the Library also maintains subscriptions to relevant subject-specific databases, including *Biological Abstracts*, *SciFinder Scholar (Chemical Abstracts)*, *Web of Science*, and more than 300 full-text journals through *OvidSP*, *ScienceDirect*, and *Wiley InterScience*. A full list of all subscribed Library databases may be found at:  
<http://www.library.astate.edu/databases/journalDB/DatabaseListing.cfm>.

All of the Library’s online subscribed content is available to students and faculty off-campus via access through the library’s proxy server.

Unlimited interlibrary loan services to faculty, staff, and students are subsidized by the Dean B. Ellis Library, so that virtually 100% of all interlibrary loan requests are completed at no cost to faculty, staff, or students. This assures faculty and students unfettered access to the resources they need, even if they are neither held inside the Library nor available through our subscribed online content. Approximately 98% of all requested journal articles are delivered to the requesting patron

electronically, and the majority of these articles are available within three days of request submission.

Through the Library's formula-based allocations to all academic departments, faculty select books, journals, and databases for purchase or subscription in their areas of subject expertise. Graduate student credit hour production, graduate degrees awarded, and the number of FTE faculty in each department are some of the major factors in the allocation formula. As new programs enroll students and those students earn their advanced degrees, the Library collection development allocation to the department which houses that degree program will increase proportionally.

### **Facilities and Equipment:**

**Laboratory:** The Laboratory Sciences buildings and the ABI facility, opened in the fall of 2004, provide ample instructional and research opportunities to support students in the PSM-Biotechnology program. The Laboratory Sciences buildings (160,000 sq. ft.) house the departments of Biology and Chemistry and Physics and the College of Engineering. Research and instructional equipment allows for quality training in molecular and cellular biology. The main campus has newly renovated instructional labs in cell and molecular biology, in addition to an instructional room dedicated to the biotechnology program (1200 sq. ft.). Recently acquired equipment includes electrophoretic apparatus, high speed and table top centrifuges, an imaging system, blotting apparatus, thermal cyclers, uv vis spectrophotometer, transilluminators, speed vac, CO<sub>2</sub> incubator, and typical molecular laboratory equipment. Additionally, a common use molecular biology lab has recently been renovated.

The ASU-ABI facility is a 88,000 sq.ft. state-of-the-art research building and over \$4,000,000 in new equipment, has the capacity to house 16-20 faculty/research groups, plus laboratory "flex space" to support specific projects and shared equipment, including graduate student team research and instructional support areas. Support facilities within these buildings include two dedicated clean rooms for plant transformation and propagation, two dedicated mammalian tissue culture clean rooms, growth chamber room, cell shaker room, walk-in growth chambers, rooftop greenhouses and headhouse, chemical storage, small animal care facility, animal housing rooms, animal procedure rooms, variety of analytical instruments including all DNA, RNA and protein analyses, a computer laboratory, variety of centrifuges, imaging instruments, microscopy facilities including STEM and SEM electron microscopes and confocal imaging, centralized dishwashing and autoclaving, etc.

**Animal Cell Culture Facilities in ABI** include two clean rooms with laminar flow hoods, CO<sub>2</sub> incubators, roller-bottle systems, centrifuges and microscopes and adjacent support room for storage of media, dedicated refrigerators, and N<sub>2</sub> cell storage. An adjacent immuno/cell biology suite is under development with BD FACSCalibur™ flow cytometer and BioRad BioPlex multiplex bead array system in place and a proposal for a cell sorter and advanced confocal microscopy system got funded recently and will be in place shortly. . An additional clean room is housed within the animal care facility to facilitate establishing primary cultures.

The **Small Animal Facility in ABI** is a 3,800 ft<sup>2</sup> complex that includes a gowning area, surgery and surgery prep room including anesthesia machines, large automatic cage-washing systems, five animal housing rooms (quarantine room, 2 rat rooms, 2 mice rooms), and two procedures rooms (one outfitted for primary cell culture). Initial outfitting provides individually vented high-density caging systems with a capacity of more than 800 mice and 800 rats in addition to the quarantine area (NIH Animal Welfare Assurance #A4506-01). Cages fitted for input/output assessment, activity sensors, and remote sensors for assessing temperature, heart rate, etc from implant monitors are also available.

**Plant Transformation and Propagation Facilities in ABI** include two equipped clean rooms for biolistic and *Agrobacterium*-mediated plant transformation and cell culture and dedicated rooms for lighted growth chambers and for shakers and hairy root biofermentors. For larger scale propagation, ABI has a 1,100 ft<sup>2</sup> plant growth room with two walk-in growth chambers, 11 fully-

computerized 3x8' Conviron environmental chambers, and space/plumbing for an additional 4 walk-in chambers to be added as needed. A roof top greenhouse provides almost 4,000 ft<sup>2</sup> of computer-control glasshouse space with an adjacent 1,680 ft<sup>2</sup> head-house area including a large walk-in cold room and pesticide/soil storage areas. Two small rooms have recently been up-fitted to facilitate growth and infiltration of *Nicotiana benthamiana* supporting enabling technology for rapid transient expression of genes and proteins in plants. NSF EPSCoR funded 2 growth chambers and balloon bioreactors for these rooms.

**Computing:** Each PI and staff has Pentium 4 or better laptop and desktop systems. Additionally, to date Arkansas State University has a backbone infrastructure that is capable of providing redundant 10 Gigabit interconnects between two dedicated routing nodes. Every building on campus has the availability of at least 1 Gigabit back to one of these designated nodes. Every desktop has at minimum a 10/100 connection rate, while many of the newer buildings have 1 Gigabit connectivity to the end user. ASU currently peers its OC3 with Internet Service Provider OneNet based in Tulsa Oklahoma, and will soon connect to the state regional optical network ARE-ON with capabilities up to 10 Gigabits.

**A Shared Bioinformatics computer laboratory** houses computers, printers, software and ancillary equipment needed to perform and instruct students to perform database searches (BLAST, TAIR, etc.), sequence analysis (Sequencher, WorkBench) modeling, primer design, structural analysis, etc.

## **CORE FACILITIES:**

**Microscopy Facilities** include a Nikon Eclipse E800 laser confocal scope and camera system, a Zeiss Axiovert 200M inverted fluorescence scope fitted with a BioVision CARV confocal system and SensiCam SVGA high-speed cooled digital camera, an FTIR microscope, and a Zeiss Axiovert 40C for brightfield, fluorescence, DIC and phase contrast. Nikon SMZ 1500 dissecting microscope with an imaging workstation. Nikon DXM 1200 digital camera for attachment with a Nikon SMZ 800 trinocular dissecting microscope. A TESCAN Vega TS 5136 XM Scanning Electron Microscope (SEM) with Oxford Instruments INCA x-sight X-ray Microanalysis Detector and a Veeco/Digital Instruments Multimode Scanning Probe and a transmission EM are also available.

The **Shared Analytical Laboratory in ABI** supports separation, detection and measurement ranging from small molecules to macromolecules and houses a Varian Saturn GC-MS (Q-it), 2 Perkin Elmer Clarus 500 GC-MS, a PerkinElmer 9000 ICP-MS, a Dionex 1000 HPLC (with PDA detector, ECD and fluorescence detectors), a Varian LC-MS-MS, Cetac LSX 500 266nm and LSX213 Laser Ablation systems, a Fluorometer, an autotitrator, clean room with laminar flow hood for sample and standard preparation, and 2 miniature time of flight spectrometers. This facility also houses equipment for homogenization, microwave assisted digestion, extraction and derivatization of plant and animal tissues. Two shared instruments, a Waters MALDI-Micro TOF MS, and a Camag TLC scanner/autosampler system were recently purchased through NSF EPSCoR funding. Additional HPLCs and FPLCs are housed within investigator-dedicated laboratories.

**Shared Molecular Biology Research Laboratory in ABI** supports molecular biology research for faculty and students. In addition to typical molecular biology apparatus, this laboratory houses a Bio-Rad CFX 96 RT-PCR, power supplies and electrophoresis equipment, a uv vis spectrophotometer, a Beckman CEQ8000 Genelab workstation, Stratagene gradient Robocycler (96 well), and BioRad VersaDoc (with phosphoimager capabilities).

## **10. NEW PROGRAM COSTS – Expenditures for the first 3 years of program operation**

Funding will be required for hiring a non-tenure track full-time Instructor/Program Director on a

12 month contract. Salary: \$55,000; Benefits: 13,750. All other required and elective courses are already being offered and taught by existing faculty. The increased enrollment in these lecture courses can be absorbed without additional cost.

Funding will be required for the supplies needed to satisfy the needs of the two summer Biotechniques laboratory courses. Anticipated supply costs are \$4,000 annually. However, additional lab fees (\$100) were approved beginning Fall 2009 by the ASU Board of Trustees for costs incurred by these courses. The increased cost to the department can ultimately be borne by tuition and fee revenues generated by student enrollment, infrastructure fees for the replacement and purchase of new supplies and equipment, and laboratory fees for the biotechniques courses.

Other than the Instructor/Program Director position described above, administrative costs will be absorbed within existing units. The PSM-Biotechnology program will be housed within the Department of Biological Sciences and the College of Science and Mathematics. The existing Chair, Dean and support staff will administer the program.

No additional costs will be incurred for library resources, new or renovated facilities, or distance learning.

#### **11. SOURCES OF FUNDING – Income for the first 3 years of program operation**

The program must receive a portion of FTE funds as well as student fees (library, technology, infrastructure) as appropriate. The program area will be able to accommodate 15 to 20 students per year. Individual tuition costs for the 36 academic hours are \$7,488 (in-state) and \$19,080 (out-of-state); fees generated are \$1,792 per student. If the emphasis area enrolls only 15 students per year, total income per cohort generated from tuition and fees would range from \$139,200 (all in-state students) to \$313,280 (all out-of-state students). Based on inquiries anticipate that most students initially would be international students, so the higher estimate may be more realistic. Although the required biotechniques laboratory courses are highly specialized and expensive the increased enrollment supported by this program will offset their cost. A \$100 lab fee per course would generate \$3,000 per summer with 15 students per course.

Additionally, Arkansas State University has applied for federal funding (NSF 09-607; Directorate for Education and Human Resources, Division of Graduate Education, Science Masters Program) for the initiation of this program (\$691,799) in November, 2009. Funding is primarily devoted to the support of entering graduate students, with other monies requested for administration, supplies, and travel. Notification date is April, 2010.

#### **12. ORGANIZATIONAL CHART REFLECTING NEW PROGRAM**

Management of the PSM-Biotechnology program is modeled after other successful graduate programs at ASU. The program will be overseen by a Program Director/Instructor with oversight provided by a Program Committee, University Administration, and an External Advisory Committee. The roles and responsibilities of each group are outlined below.

**Program Director/Instructor:** The distribution of this position is 40% Director/ 60% Instructor. This will be a non-tenure track position with no research responsibilities. Rather, the focus of this individual is to maintain the program and to maintain currency in evolving technologies and applications. The Program Director is responsible for coordination of all administrative aspects of the program on a daily basis, including student recruitment, admissions, retention, committee activities, faculty coordination in instruction and internships, curriculum quality, assignment of

graduate assistant awards and course instruction. Annual reports will be prepared by the Program Director and submitted to the Chair of the Department of Biological Sciences, the Dean of the College of Sciences and Mathematics, the Program Committee and the Advisory Committee. Specific courses taught by the Program Director include: Introduction to Biotechnology and Internship in Biotechnology (Fall), Biosafety and Ethics in Research (Spring), Laboratory in BioTechniques I (Summer I), Laboratory in BioTechniques II (Summer II). The program director will serve as the program manager for the duration of the grant.

**Program Committee:** This committee consists of five participating faculty in the Biotechnology Program as appointed by the Dean of the College of Science and Mathematics. The faculty of the Program Committee will be appointed to staggered three-year terms. The Program Committee will work with the Program Director to provide direction and oversight for the program, including development and implementation of all policies pertaining to the program (e.g., governing student committees, students, curriculum, admissions, student recruitment and retention, examinations, student progression toward degree completion, instruction, internships, etc.).

**Administration:** The Program Director will report to the Chair of the Department of Biological Sciences who will forward annual reports to the Dean of the College of Science and Mathematics. The Chair will perform annual evaluations of the Director's performance. Administrators will assure that internship and academic goals are being addressed by the program's activities.

**External Advisory Committee:** This Committee consists of external directors, researchers and academicians from participating academic, research units and industry. This Advisory Committee will work with the Program Director and Program Committee to evaluate program curriculum and content. These individuals will provide insight as to present and future industry needs. For the first two years, there will be an annual on-site meeting in addition to an annual teleconference of this committee, followed by annual teleconferences to discuss progress and direction of the program. The Advisory Committee consists of the following individuals from a cross-section of business, Academia and industry: Dr. Carole Cramer, Executive Director of Arkansas Biosciences Institute; Dr. Elizabeth Hood, Lipscomb Distinguished Professor, ASU; Dr. Steven F. Jennings, Professor of Bioinformatics, University of Arkansas at Little Rock; Mr. Timothy Hodge, Founder and Chief Science Officer of Transnetyx, Inc.; Dr. Steven Brooks, Molecular Plant Pathologist, Dale Bumpers National Rice Research Center; and Thomas Flammang, Associate Director for Science and Policy, National Center of Toxicology and Research (see support letters in Appendix D).

### 13. SPECIALIZED REQUIREMENTS

None

### 14. BOARD OF TRUSTEES APPROVAL

Provide the date that the Board approved the proposed program

### 15. SIMILAR PROGRAMS

Few programs exist nationally to supply the need for Professional Science Masters professionals, and there are no Professional Science Masters programs in Arkansas. There is a broadly based interdisciplinary Graduate Program in Cell and Molecular Biology focused at the doctoral level at the University of Arkansas-Fayetteville. The very high demand for this UA program speaks to the need for a second similar program at the opposite end of the state in order to address the new ABI initiative. The statewide Arkansas Biosciences Institute, as represented by the new ABI building at ASU (a 76,000 sq. ft. research complex) and the millions of dollars in research support, has

generated a demand for a PSM degree to accommodate the new students and research mandate. Environmental, Agricultural and non-Biomedical systems are the emphasis areas at ASU.

There are both M.S. and Ph.D. degrees offered by the Department of Biochemistry and Molecular Biology at the University of Arkansas Medical School, which focuses primarily on problems restricted to biomedical research. Thus, students interested in Molecular and Cell Biology as related to Environmental, Agricultural or non-Biomedical systems would have limited access to training.

Kentucky – There are no Professional Science Masters programs in Kentucky. The Biology Department at the University of Kentucky offers two programs, a MS as well as a Ph.D. in Environmental and Evolutionary Biology (EEB) or Molecular and Cellular Biology (MCB). There is also an Integrated Biomedical Sciences graduate program; however, it caters to biomedical sciences. Degrees in Biochemistry and Molecular Biology are also available from Louisville University.

Louisiana - There is a Professional Science Masters program at Southeastern Louisiana State University, yet the specific degree differs in that their Master of Integrated Science and Technology (ISAT) degree emphasizes applications of Industrial Technology, Mathematics, Chemistry, and Physics. Beyond this program, no other interdisciplinary graduate programs in Molecular Biosciences are currently available. Degrees in Biochemistry and Molecular Biology are available from LSU in Baton Rouge and The LSU Medical School. Tulane University offers a Ph.D. in Molecular and Cell Biology that includes research involving environmental issues.

Missouri - There are no Professional Science Masters programs in Missouri. Additionally, there are no known interdisciplinary graduate programs in Molecular Biosciences. Degrees in Biochemistry and Molecular Biology are available from the University of Missouri system. Departmental programs in Molecular Biology, Molecular Genetics and Molecular Cell Biology are available from Washington University and in Molecular Biosciences from St. Louis University.

Oklahoma - There are no Professional Science Masters programs in Oklahoma. Additionally, no known interdisciplinary graduate programs in Molecular Biosciences are currently available. Degrees in Biochemistry, Cell Biology and Molecular Biology are available through individual Departments at the University of Oklahoma and Oklahoma State University. Biomedical Molecular Biology degrees are available through the Medical School.

Tennessee - The institution closest to ASU that offers a Professional Science Masters program similar to the one we propose is greater than 300 miles in distance (Middle Tennessee State University). There is an inter-disciplinary graduate program in molecular biosciences at Vanderbilt University. Degrees in Biochemistry and Molecular Biology are also available from the University of Tennessee.

Texas – Several PSM programs exist in Texas, with two of these programs (University of North Texas and Texas A&M University) offering Biotechnology degrees. Other PSM programs are unrelated to this. Additionally, there are interdisciplinary programs in Genetics, Biochemistry and Molecular Biology at Texas A&M University. Non-interdisciplinary programs in Molecular and Cell Biology also exist at Baylor, Texas Tech, University of Texas and several other state and private universities. However, the strong link with agriculture is primarily at Texas A&M.

A copy of the electronic notification to other state institutions offering graduate programs in the area of the proposed program and their responses is enclosed as Appendix E.

## 16. DESEGREGATION

The PSM-Biotechnology program will recruit talented students interested in biotechnology from across the U.S. with a focus on students within Arkansas and the Delta states. The administration at ASU is committed to improving opportunities for disadvantaged, low income and first generation students during their undergraduate and graduate careers. ASU has a proven record of providing undergraduate education to under-represented minority students. The majority of students at ASU are from the Lower Mississippi Delta, and 56% are first-generation college students from families of modest means. Of these first generation students, 36% are of African American descent. Further, approximately 16% of the ASU student body is African American, consistent with the state-wide percentage of 15.8% African American. The Lower Mississippi Delta Region, including 42 counties in Arkansas (**an EPSCoR state**), is one of the poorest areas in the country, affected by widespread poverty and a host of social problems. Only 6.4% of citizens in Arkansas hold a graduate or professional degree (compared to 10.1% nationally), placing the state as one of the worst in the nation for graduate degree attainment. Our proposed program will address provisions of the **America Competes Act** targeted at improving graduate degree attainment in states with a low percentage of citizens holding graduate degrees. In addition, we will recruit students from currently funded NSF and NIH education and research programs at ASU to broaden the impact of these programs.

#### **17. INSTITUTIONAL AGREEMENTS/MEMORANDUM OF UNDERSTANDING (MOU)**

There are no institutional agreements binding. Letters of agreement for agencies agreeing to mentor interns are included in Appendix A.

#### **18. ADDITIONAL INFORMATION REQUESTED BY ADHE STAFF**

#### **19. Literature Cited**

Arkansas State University Factbook. 2009. <http://www2.astate.edu/a/irp/factbook/20082009.pdf>. Accessed November 2, 2009.

Barab, S.H. and A.L. Leuhmann. 2003. Building sustainable science curriculum: Acknowledging and accommodating local adaptation. *Science Education* 87:454-467.

BioPlan Associates. 2009. <http://www.bioplanassociates.com>. Accessed October 15, 2009.

Salas, E., Rozell, D., Mullen, B., and Driskell, J.E. 1999. The effect of team building on performance. *Small Group Research* 30 (3):309-329.

U.S. Bureau of Labor Statistics. 2009. <http://www.bls.gov>. Accessed October 23, 2009

U.S. Census Bureau: FactFinder. 2009. <http://www.factfinder.census.gov/>. Accessed November 4, 2009.



**New Program Proposal-Bulletin Change Transmittal Form**

**Graduate Council** - Print 1 copy for signatures and send 1 electronic copy to [mmcginnis@astate.edu](mailto:mmcginnis@astate.edu)

**New Program** (The following critical elements are taken directly from the Arkansas Department of Higher Education's "Criteria and Procedures for Preparing Proposals for New Programs".) Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.

---

 Department Curriculum Committee Chair

Date

---

 COPE Chair (if applicable)

Date

---

 Department Chair

Date

---

 General Education Committee Chair (if applicable)

Date

---

 College Curriculum Committee Chair

Date

---

 Undergraduate Curriculum Council Chair

Date

---

 College Dean

Date

---

 Graduate Curriculum Committee Chair

Date

---

 Vice Chancellor for Academic Affairs

Date

**1. Proposed Program Title**

**Doctor of Philosophy (PhD) in Educational Leadership**

**2. CIP Code Requested**

**13.0401**

**3. Contact Person** (Name, Name of Institution, Address, Email Address, Phone Number)

**George Foldesy, Director  
Arkansas State University  
Center for Excellence in Education  
P. O. Box 1270  
State University, AR 72467  
gfoldesy@astate.edu  
(870) 972-3943**

**4. Proposed Starting Date**

**08/15/10**

**5. Program Summary** (Provide a general description of the proposed program. Include an overview of any curriculum additions or modifications; program costs; faculty resources, library resources, facilities and equipment; purpose of the program; and any information that will serve as introduction to the program.)

**The PhD in Educational Leadership provides the highest professional degree available to students who aspire to college teaching and /or research careers. Although the degree requirements include a 105 credit prescribed curriculum required and elective courses, the doctoral degree is not only awarded on the basis of coursework completion. In addition, each doctoral student is expected to complete the comprehensive examination requirement and conduct a major research project resulting in the defense of a dissertation.**

**The academic program's mission is accomplished through graduates who:**

- Apply the program's academic knowledge base in bringing about creative changes and innovations within**

organizations;

- Understand human behavior within the organization as well as the transactional relationship between the organization and its external environment;
- Utilize appropriate research principles to resolve problems and conflicts;
- Utilize, teach and research in the professional knowledge base concerning learning theories, knowledge acquisition, and the nature of the educational environment in promoting sound educational practices.

The PhD program consists of 105 credits. Twenty-four are dedicated to the nature of the organization, 21 credits comprise the Research Core, 3 credits will be dedicated to Philosophy of Education, and 6 credits focus on preparation for employment. In addition, students will choose an 18 hour area of emphasis in either higher education or school administration. Twenty-one hours of electives will compliment the program. The capstone of the PhD will be a 12 hour dissertation.

An amount of \$79,000 will be requested to supplement the existing EdD budget. As delineated in the budget section, the additional money will be used to fund and support research assistants, augment the present operating budget and increase library expenditures.

At least initially, there will be no requests for additional faculty. The increased work load may be accommodated by employing various scheduling strategies and reassignment of faculty. Presently, the physical facilities seem to be adequate. Budget requests may be re-evaluated as the program matures.

The EdD program, which has been in place for 17 years, will share resources with the proposed PhD program. The present faculty will continue to teach courses shared between both programs. Existing facilities will house both programs and the present library collection will serve as the foundation for the PhD program.

**6. Need for the Program** (Provide survey data on student interest, job availability, corporate demands and employment projections. Focus mostly on state needs and less on regional and national needs, unless applicable to the program.)

The purpose of this proposal is to seek approval for a PhD in Educational Leadership. This program will be offered concurrently with the present EdD. The impetus for this proposal stemmed from frequent student inquiries as to whether the Center offered the PhD. Since the advent of the EdD program in 1992, the Center has responded to over 100 inquiries each year from individuals interested in pursuing a doctorate. Approximately one-third of these students specifically request information about the PhD. After learning that ASU does not offer this degree, several potential students noted that their interests lie exclusively with the Doctor of Philosophy and never enroll in the Center. However, some do in fact pursue the EdD. Once enrolled, several students continued to ask about the possibility of the Center acquiring the PhD. For some, the desire is so strong that even those who have earned the EdD continually express interest in obtaining the Doctor of Philosophy and are willing to fulfill the requirements to do so.

The allure of the PhD is that many of our students already have established careers in higher education while others aspire to faculty and/or administrative positions in community colleges and universities. These students believe that the PhD is favored as the degree of choice in many research universities for employment purposes.

A recent survey conducted by the Center queried 76 doctoral students enrolled in the EdD program at Arkansas State University over the past five years to determine which degree was preferred by them and why. The results indicated that 9 chose the EdD, 21 favored the PhD and 12 had no preference.

Of the respondents who chose the PhD option, approximately half see the PhD as being more highly regarded, prestigious, and marketable – especially for university-level teaching. The other half specifically referred to research skills needed in the profession, both in higher education and K-12 administration.

The respondents who chose the EdD option almost unanimously describe themselves as practitioners, whether they are employed in higher education or K-12 education. The EdD seems more practical and relevant to the leadership positions they hold or aspire to in the future.

Of the respondents who had no preference, four provided no reason. The other eight indicated that the degrees would be equally appropriate for their career goals, although two added that they would choose the EdD if both were offered.

Finally, it should be noted that the PhD is the degree of preference for international students since it is traditional and accepted worldwide, whereas the EdD is indigenous to the United States. The addition of the PhD should increase international enrollments and help diversify our enrollments for the doctoral program and provide a different perspective to doctoral students native to the Arkansas and the Delta region. ASU's PhD program will accommodate students who aspire to have careers in higher education and institutional research positions in the larger public school districts. The faculty is of the opinion that the proposed PhD will enrich ASU's long established EdD program while providing career options for our students.

7. **Curriculum Outline** (Identify new courses and state program admission requirements.)

**Doctor of Philosophy Degree in Educational Leadership: CHECKLIST**

**Doctoral Knowledge Core**

ELAD 8043 Adv. Organizational Theory & Inquiry.....	3
ELAD 8313 Educational Leadership Prac .....	3
ELFN 8763 Socio-Cultural Foundations of Education....	3
ELFN 8253 Education Policy and the Law.....	3
ELAD 8203 Politics of Education.....	3
ELCI 8213 Curriculum and Instruction.....	3
ELAD 8333 Organization Development .....	3
*ELAD 8323 Comparative Education.....	<u>3</u>

24

**Research Core**

ELFN 6773 Intro to Statistics & Research.....	3
ELFN 7773 Advanced Educational Research.....	3
ELFN 7783 Advanced Educational Statistics.....	3
*ELFN 8793 Multivariate Analysis.....	3
ELAD 8241 Research Module1 (one credit).....	1
ELAD 8251 Research Module 2 (one credit).....	1
ELAD 8261 Research Module 3 (one credit).....	1
ELFN 8783 Qualitative Research and Evaluation .....	3
ELFN 8773 Educational Research and Evaluation .....	<u>3</u>

21

**Foundations Core**

ELFN 6763 Philosophies of Education.....	<u>3</u>
--	----------

3

**The Higher Education Profession Core**

*ELAD 8243 Epistemology, Learning & Pedagogy.....	3
*ELAD 8053 Perspectives on an Academic Career in Higher Education.....	<u>3</u>

6

**College Leadership**

ELAD 6273 Legal Aspects of Higher Education.....	3
ELAD 6313 Higher Education Finance.....	3
CCED 7003 The Community College.....	3
CCED 7013 Community College Teaching.....	3
CCED 7033 Sp Prob in Comm College Tchg.....	3
ELAD 6323 Org & Gov of Higher Education.....	<u>3</u>

or

**School Leadership**

ELAD 6073 School Law.....	3
ELAD 6053 Planning & Resource Allocation...	3
ELAD 6103 Ethical Leadership.....	3
ELAD 6033 Admin & Supv of Special Educ.....	3
	<u>3</u>

**(choose two below)**

ELCI 6083 Supv & Eval of Teaching.....	3
ELAD 6063 Curriculum Management.....	3
ELAD 6003 School & Community Relations...	3
ELED 6023 Elementary School Curriculum....	3
ELCI 5523 Middle School Curriculum.....	3
ELCI 6523 Secondary School Curriculum.....	<u>3</u>

18

**Electives**

21

**Dissertation**

12

\*New Course

**TOTAL HOURS: 105**

Four new courses being proposed: ELAD 8323 - Comparative Education  
ELFN 8793 - Multivariate Analysis  
ELAD 8243 - Epistemology, Learning & Pedagogy  
ELAD 8053 - Perspectives on an Academic Career in Higher Education

See APPENDIX A for Course Syllabi

**Admission Criteria:**

Full admission to the doctoral program is predicated on the following criteria: (1) academic ability, (2) scholarship, and (3) professional promise. These criteria provide both the Center and the applicant with an indication of probable success in the program. In addition, the applicant must hold an earned master's degree.

**Requirements for Admission Consideration:**

1. A completed application form accompanied with a \$50 non-refundable fee.  
(See <http://graduateschool.astate.edu>).
2. One set of official transcripts of all undergraduate and graduate work completed, mailed directly to the Center from all institutions attended.
3. Official report of scores for the Miller Analogies Test or the Graduate Record Examination less than five years old. Arrangements for testing can be made by contacting the Testing Center at 870.972.2038 or <http://testing.astate.edu>.
4. Letters of appraisal and recommendation should be mailed to the Center from four (4) persons: a supervisor and three college professors. (Any reference should be qualified to speak with authority on the applicant's perceived strengths and weaknesses as a candidate for the doctoral program.)
5. Successful completion of the writing requirement such as a master's thesis, research paper, journal article, term paper, or field study.
6. A personal statement including reasons for pursuing advanced graduate education, career goals, how the program in educational leadership would help to meet these goals, and prior experiences which relate to your interest in and aptitude for the graduate program.
7. An interview with the Center Committee on Admissions may be required.
8. Mail the fee and all documents to:  
Director  
Center for Excellence in Education  
Arkansas State University  
P.O. Box 1270  
State University, AR 72467
9. After acceptance into the program, each doctoral applicant is required to pay a \$500 non-refundable deposit to reserve a place in the designated cohort. Students who do not respond by the stipulated date will have their position assigned to another applicant. Upon attending the first semester of the program, the deposit will be applied to the student's tuition payment the following spring semester. Forfeited fees will revert to the Center for Excellence in Education and be used to support graduate student activities such as expenses related to the presentation of a scholarly paper, publication costs, or in support of research projects germane to the field of educational leadership.

The form used to evaluate each class follows:



**8. Faculty** (List names, credentials, and rank of faculty who will be teaching courses in the proposed program.)

The research interests of CEE faculty are:

Dr. John Beineke, Professor:	policy, leadership, history and philosophy of education and reflective practice
Dr. Daniel Cline, Professor:	planned change in higher education, research methods
Dr. David Cox, Professor:	leadership and organization development
Dr. George Foldesy, Professor:	policy and the law
Dr. Mitch Holifield, Professor:	ethics, politics and leadership
Dr. David Holman, Associate Professor:	curriculum, qualitative and quantitative research methods
Dr. Amany Saleh, Professor:	curriculum theory and supervision of instruction

The Center for Excellence in Education (CEE) has seven core faculty members. Of the seven, one professor, Dr. Cox, has chaired and completed nearly 100 dissertations. Five professors, Cline, Cox, Foldesy, Holifield and Holman, have completed approximately 12 to 30 dissertations each. Four - Cline, Cox, Foldesy and Holman - of the seven professors, have held rank as doctoral faculty at other universities. In addition to chairing dissertations, all faculty have been and continue to assume membership on numerous doctoral committees. The newest member of CEE, Dr. Saleh, has completed 2 dissertations, and is a member on several committees and advises approximately six doctoral students. Dr. Beineke, former Dean of the College of Education, has taught doctoral level courses when needed. Dr. Beineke is active in chairing and participating on dissertation committees and has been an external dissertation reviewer.

Existing faculty are experienced researchers and maintain an expertise in specific academic areas which compliment the program. Selection of methodology is a function of the problem statement. Professors tend to favor research design and treatment of data that best suits their research goals. For example, a study that focuses on policy analysis may be more qualitative in nature while research focusing on the relationship between wealth and achievement levels will be more quantitative.

It should be noted that all seven professors have presented papers at International Conferences. Three are active in the European Teacher Exchange Network and attend annually.

See APPENDIX B for faculty vita

**9. Description of Resources** (Current library resources including relevant holdings, current instructional facilities including classrooms, instructional equipment and technology, laboratories.)

Present physical facilities, library resources and instructional equipment and technology are adequate to support the PhD program.

The Dean B. Ellis Library currently holds over 24,000 books in the "L" call number range for Education. Of that number, more than 3,600 are in the LB2805 to LB3099 range for the subject area of Educational Administration. There are also numerous relevant books in other areas of the collection. As examples, there are over 650 titles in the BF 311 range on the specific topic of Cognition. Additionally, the Library has subscription based access to thousands of current journals and periodicals, with more than 400 of these journals having possible subject-specific relevancy to students in an Educational Leadership PhD program.

The Library currently subscribes to more than 100 online databases covering all academic disciplines. In addition to major full-text databases with relevancy for doctoral students, such as *Dissertations & Theses full-text (formerly Dissertation Abstracts)*, *JSTOR*, and *LexisNexis Academic*, the Library also maintains subscriptions to education subject-specific databases, including EBSCO's *Education Research Complete* and *Professional Development Collection*. A full list of all subscribed Library databases may be found at:

<http://www.library.astate.edu/databases/journalDB/DatabaseListing.cfm> .

All of the Library's online subscribed content is available to distance learning students via access through the library's proxy server.

Unlimited interlibrary loan services to faculty, staff, and students are subsidized by the Dean B. Ellis Library, so that virtually 100% of all interlibrary loan requests are completed at no cost to faculty, staff, or students. This assures faculty and students unfettered access to the resources they need, even if they are neither held inside the Library nor available through our subscribed online content. Approximately 98% of all requested journal articles are delivered to the requesting patron electronically, and the majority of these articles are available within three days of request submission.

Through the Library's formula-based allocations to all academic departments, faculty select books, journals, and databases for purchase or subscription in their areas of subject expertise. Graduate student credit hour production, graduate degrees awarded, and the number of FTE faculty in each department are some of the major factors in the allocation formula. As new programs enroll students and those students earn their advanced degrees, the Library collection development allocation to the department which houses that degree program will increase proportionally.

This year, the CEE moved into a newly renovated facility complete with offices, classroom space and an updated computer lab. This area provides adequate room for the present class offerings and activities associated with doctoral work. It is anticipated that this space will also be sufficient to accommodate the proposed PhD program.

We are currently in the process of creating a smart classroom to facilitate instruction. It is anticipated that the completion date will be in December 2009. Given the remodeled facility and the improvements planned for the classroom, it is expected that no budget increase will be needed for physical facilities.

**10. New Program Costs** (New administrative costs, new faculty costs, new library resources and costs, new instructional equipment and costs, distance delivery costs, other new costs. If no new program costs, explain.)

New program costs will require \$79,000 annually. The proposed budget is as follows:

Four graduate assistants @ \$15,000	=	\$ 60,000
Graduate assistantship travel @ \$1,000	=	\$ 4,000
Increase in operating	=	\$ 5,000
Library enhancement	=	<u>\$ 10,000</u>
<b>TOTAL</b>		<b>\$ 79,000</b>

Since many of the classes in the established EdD curriculum will also serve the PhD program, the established doctoral faculty including the former Dean of Education who has returned to the professorship will be sufficient to support the PhD program. No new administrative costs will be needed since the existing Director and administrative assistant will assume the responsibilities for the proposed program.

As noted in Section 9, Description of Resources, the physical facilities, instructional equipment and technology are less than a year old and will accommodate the new program. The upgrading of the present classroom to a "smart classroom" will occur on or before December 2009 which is prior to the approval of the PhD program. Therefore, no new funds will be needed.

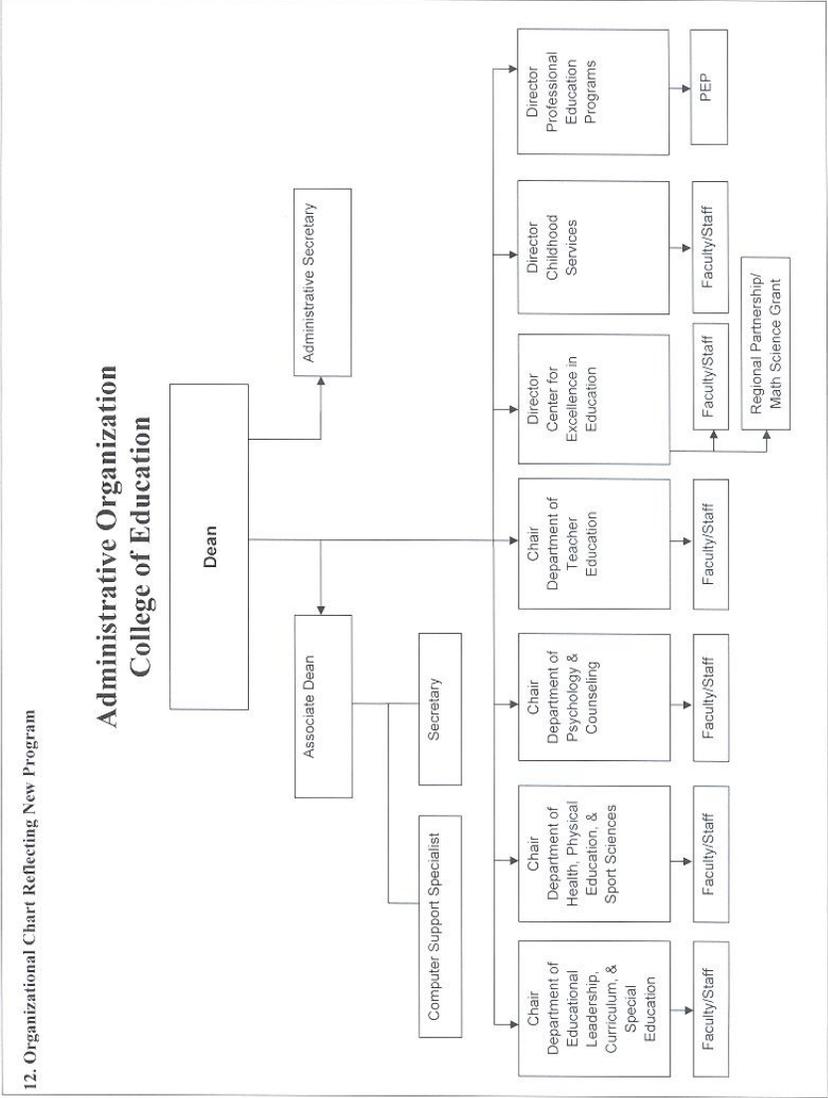
**11. Sources of Funding** (Reallocation from where? Tuition and fees? Other?)

Many of the courses and faculty that presently comprise the EdD curriculum will be shared with the proposed PhD program, thus cutting costs. The 2009-2010 operating budget for the CEE will serve as the foundation for the PhD program. The three CEE doctoral graduate assistants are funded by the Graduate School.

As pointed out in Section 10, the CEE is requesting an additional \$79,000 per year. It is anticipated that \$60,000 for four additional graduate assistantships will be acquired through a reallocation of funds by the Graduate School. Most of the \$10,000 in library enhancement will eventually be funded through reallocation of library funds as the PhD enrollment increases. Distributions of library funds are formula driven with doctoral programs given high priority. Although it is difficult to exact the amount of revenue that would be provided to the PhD program, the CEE is optimistic that all or a significant amount of the requested monies will be obtained through the library budget.

Nine thousand dollars of the budget request (graduate assistant travel = \$4000 + CEE operating=\$5000) will be generated through tuition and fees. Cost of tuition and fees are \$332 per credit hour. In-state students will carry 6 credits for the Fall, Spring and Summer semesters for a total of \$5976/year. It is anticipated that the PhD program will enroll 8 resident students for a total of \$47,808. Tuition and fees for nonresident students is \$654 per credit hour. These students will also enroll in a minimum of 6 credits for the Fall, Spring and Summer semesters for a total of \$11,772/year. It is expected that the program will conservatively enroll two nonresident students totaling \$23,544 annually. The entire revenue generated from the eight resident and two nonresident students will be \$71,352. In addition, ASU receives \$6,058 per student in state appropriation funding. The anticipated ten students who enroll in the PhD program will generate an additional \$60,580 annually. Total revenue from all funding sources including redistribution will be \$201,932.

12. Organizational Chart Reflecting New Program



**13. Specialized Requirements** (Specialized accreditation requirements for the program, Licensure/certification requirements for student entry into the field.)

None

**14. Board of Trustees Approval** (The proposed date the BOT will consider the new program.)

President/Chancellor Approval Date: January, 2010

Board of Trustees Approval Date: January, 2010

**15. Similar Programs**

The only PhD program in educational leadership offered in Arkansas is at the University of Central Arkansas which is approximately a 1 ½ hour drive from the Jonesboro ASU campus. No other PhD program exists in Arkansas or regionally within commuting distance of ASU. ASU's PhD program will accommodate students who aspire to have careers in higher education and institutional research positions in the larger public schools districts. The faculty are of the opinion that the proposed PhD will enrich ASU's long established EdD program while providing career options for our students.

Approximately 200 universities nationally offer the doctorate in education. Of this number, about 120 institutions grant degrees in either educational leadership, educational administration and/or policy studies. About half of these programs offer only the EdD while the remaining half offer both the EdD and the PhD. Several universities combine areas of study, such as Leadership and Policy Studies. Titles are often misleading because each institution treats the program differently. Some are interdisciplinary, while others rely solely on departmental resources. Many focus on state issues where they are located while others emphasize a global perspective. Given these, among other variables, it becomes difficult to categorize these programs and determine how they are substantively different or similar to one another.

The important issues are that the proposed PhD: (1) does not duplicate any doctoral programs in the state or regionally and may be unique from those with a national presence; (2) provides our students with career options; and (3) enriches our long standing EdD program.

**16. Desegregation** (Describe black student recruitment and retention strategies. State the percentage of black students enrolled in institution and projected percentage in new program.)

The Center for Excellence in Education (CEE) sends doctoral materials (EdD) to all public schools and community colleges within a 150 mile radius of ASU. Included in this mailing are schools that are heavily minority. The CEE is represented by the Graduate School in Graduate Fairs and has recruited at historically black institutions throughout a three state area. Students presently enrolled at ASU are also recruited from masters and specialist level courses. Our newsletter includes pictures of cohort members (which are about 20% minority). Word of mouth seems to stimulate a great amount of interest in our program. These practices will be used for the PhD program.

All doctoral students, including minorities, are given individual attention by the professors, their advisor and cohort members when needed. A three credit seminar on dissertation writing is taken by all students. This seminar is an attempt to counteract low completion rates because of the inability to finish the dissertation. Although the national completion rate for doctoral programs in educational leadership is 50%, the program in CEE graduates approximately 80% of its students.

The EdD program has enrolled a total of 94 students in the last seven cohorts (2004-2009). Twenty-one of these students are African American and an additional four are other minority. The CEE anticipates approximately the same diversity in the PhD program.

**17. Does this affect other programs? If yes, how?**

N/A Institutional Agreements / Memorandum of Understanding (MOU)

**From the most current electronic version of the bulletin, copy all bulletin pages that this proposal affects and paste it to the end of this proposal.**

**To copy from the bulletin:**

1. Minimize this form.
2. Go to <http://registrar.astate.edu/bulletin.htm> and choose either undergraduate or graduate.
3. This will take you to a list of the bulletins by year, please open the most current bulletin.
4. Find the page(s) you wish to copy, click on the "select" button and highlight the pages you want to copy.
5. Right-click on the highlighted area.
6. Click on "copy".
7. Minimize the bulletin and maximize this page.
8. Right-click immediately below this area and choose "paste".
9. For additions to the bulletin, please change font color and make the font size larger than the surrounding text. Make it noticeable.
10. For deletions, strike through the text, change the font color, and enlarge the font size. Make it noticeable.

**Resource Requirements**

	<u>1<sup>st</sup> Year</u> (in dollars)	<u>2<sup>nd</sup> Year</u> (in dollars)	<u>3<sup>rd</sup> Year</u> (in dollars)
Staffing (Number)			
Administrative/Professional			
Full-time faculty			
Part-time faculty			
Graduate Assistants - 4 @ \$15,000	\$ 60,000	\$ 60,000	\$ 60,000
Clerical			
Equipment & Instructional Materials			
Library	10,000	10,000	10,000
Other Support Services			
Supplies/Printing	2,500	2,500	2,500
Travel – GA Travel (4 @ \$1,000)	4,000	4,000	4,000
Distance Technology			
Other Services (specify) – Operating	<u>2,500</u>	<u>2,500</u>	<u>2,500</u>
TOTAL	\$ 79,000	\$79,000	\$ 79,000

**Planned Funding Sources**

	<u>1<sup>st</sup> Year</u> (in dollars)	<u>2<sup>nd</sup> Year</u> (in dollars)	<u>3<sup>rd</sup> Year</u> (in dollars)
New Student Tuition and Fees	\$ 71,352	\$ 71,352	\$ 71,352
New State General Revenue (10 @ \$6,058)	60,580	60,580	60,580
Redistribution of State General Revenue	---	---	---
External Grants/Contracts	---	---	---
Other Funding Sources (specify) – Redistribution of funding from Graduate School & Library – See Section 11	<u>70,000</u>	<u>70,000</u>	<u>70,000</u>
TOTAL	\$ 201,932	\$ 201,932	\$ 201,932

021610