



**1. Overview**

A. Provide a brief description of the new certificate.

The biomedical research certificate combines authentic research experience(s) conducted in the laboratories of practicing academic scientists with upper-division course work, including laboratory courses, that allow for specialization in given subject areas. It is intended to serve students seeking competency in addressing scientific questions in the laboratory so that these students are highly competitive for careers in the research sector or for graduate and professional school opportunities, such as medical school.

B. This proposed certificate (check one):

- Is cross disciplinary; or
- Is certified by a professional or accredited organization/governmental agency; or,
- Clearly leads to advanced specialization in a field; or,
- Is granted to a program that does not currently have a major.

C. Why should this be a certificate rather than a concentration or a minor?

This will serve students from multiple degree programs from multiple schools/colleges, and so it would not work well as a concentration within one degree. A certificate offers students more flexibility than a minor, and can be offered (eventually) as a postbaccalaureate option for students who complete their BS but are searching for more training prior to applying for medical school or graduate school.

D. Affiliation

If the certificate program is affiliated with a degree program, include a brief statement of how it will complement the program. If it is not affiliated with a degree program, incorporate a statement as to how it will provide an opportunity for a student to gain knowledge or skills not already available at ASU.

It is not affiliated with any particular degree program, but is meant to serve students from a variety of backgrounds by providing practical and applied experiences necessarily for biomedical research careers. The certificate combines these with appropriate coursework to supplement the experiences, providing for well-rounded students as they enter the field. Students often seek such experiences, but find it difficult to locate the right programs or opportunities. With the certificate, we provide students with the mechanism add these experiences to their ASU program of study.

E. Demand

Explain the need for the new certificate (e.g., market demand, interdisciplinary considerations).

While such certification is not required for graduate or medical schools, for example, gaining entry into these programs is highly competitive. This certificate will provide students with the scientific skills to demonstrate their preparedness for such programs.

F. Projected enrollment

What are enrollment projections for the first three years?

	<b>1<sup>st</sup> Year</b>	<b>2<sup>nd</sup> Year</b> (Yr. 1 continuing + new entering)	<b>3<sup>rd</sup> Year</b> (Yr. 1 & 2 continuing + new entering)
Number of Students (Headcount)	15	30	45

**2. Support and Impact**

A. Faculty governance

Provide a supporting letter from the chair of the academic unit verifying that the proposed certificate has received faculty approval through appropriate governance procedures in the unit and that the unit has the resources to support the certificate as presented in the proposal, without impacting core program resources.

School of Mathematical and Natural Sciences - Letter attached

B. Other related programs

Identify other related ASU programs and outline how the new certificate will complement these existing ASU programs. (If applicable, statements of support from potentially-affected academic unit administrators need to be included with this proposal submission.)

This program is designed specifically to simultaneously support students in the Biology BS within New College and the students coming to the West campus as part of the Medical Studies BS within the College of Health Solutions

Statement from the College of Health Solutions attached

C. Letter(s) of support

Provide a supporting letter from each college/school dean from which individual courses are taken.

**3. Academic Curriculum and Requirements**

**A. Knowledge, competencies, and skills**

List the knowledge, competencies, and skills (learning outcomes) students should have when they complete this proposed certificate. Examples of program learning outcomes can be found at (<http://www.asu.edu/oue/assessment.html>).

Students who complete this certificate will show competency in basic laboratory procedures specific to the area of science that interests them (where they conduct their research). They will demonstrate the ability to formulate and test hypotheses, design and perform controlled experiments, and analyse data to examine trends and to measure outcomes. They will be able to communicate their findings in written and verbal formats in a professional setting.

**B. Admissions criteria**

List the admissions criteria for the proposed certificate. If they are identical to the admission criteria for the existing major and degree program under which this certificate will be established, please note that here.

3.00 cumulative GPA in ASU course work and upper-division standing or graduate student status.

**C. Curricular structure**

Provide the curricular structure for this certificate. Be specific in listing required courses and specify the total minimum number of hours required for the certificate.

**Required certificate courses**

Prefix	Number	Title	Is this a new Course?	Credit Hours
STP	280	Probability and Statistics for Researchers	No	3
<i>Section sub-total:</i>				3

**Elective certificate courses**

Choose at least two of the courses below:

Prefix	Number	Title	Is this a new Course?	Credit Hours
BCH	371	Modern Concepts in Biochemistry (with laboratory, BCH 372)	No	4
BIO	353	Cell Biology (with laboratory, BIO 354)	No	4
BIO	360	Animal Physiology (with laboratory, LSC 359)	No	4
BIO	443	Applied Molecular Genetics and Genomics (with lab, LSC 447 Molecular Genetics Laboratory)	No	4
MIC	443	The Microbial Universe (with laboratory MIC 444)	No	4
<i>Section sub-total:</i>				8

**Other certificate requirements**

	Credit Hours
E.g. – Capstone experience, internship, clinical requirements, field studies, foreign language skills as applicable	
LSC 499 Individualized Instruction*	4
OR	
LSC 388 Research Fundamentals for the Natural Sciences	4
*Students will register for LSC 499 (2) in two consecutive semesters for a total of 4 credit hours (2 credits per semester)	

Section sub-total: 4

**Total minimum credit hours required for certificate 15**

D. Minimum residency requirement

How many hours of the certificate must be ASU credit?

12 (9 of which must not simultaneously count towards the student's BA or BS)

E. New Courses

Provide a brief course description for each new course.

none

Note: All new required courses should be submitted in Curriculum Changemaker and ready for Provost's Office approval before this certificate is put on Curriculum and Academic Programs Committee (CAPC) agenda.

**4. Administration and Resources**

A. Administration

How will the proposed certificate be administered (including admissions, student advisement, retention, etc.)?

Faculty and advising will work to recruit and retain students in the program. Admission to the certificate will be completed with the help of advisors.

B. Resources

What are the resource implications for the proposed certificate, including any projected budget needs? Will new books, library holdings, equipment, laboratory space and/or personnel be required now or in the future? If multiple units/programs will collaborate in offering this certificate, please discuss the resource contribution of each participating program. Letters of support must be included from all academic units that will commit resources to this certificate.

We have sufficient advising staff to implement.

C. Primary Faculty

List the primary faculty participants regarding this proposed certificate. For interdisciplinary certificates, please include the relevant names of faculty members from across the University.

<b>Name</b>	<b>Title</b>	<b>Area(s) of Specialization as they relate to proposed certificate</b>
Lara Ferry	Professor	Functional Morphology
Peter Jurutka	Associate Professor	Endocrinology
Jennifer Hackney Price	Assistant Professor	Developmental Biology
Todd Sandrin	Professor	Molecular Biology
Beth Polidoro	Assistant Professor	Chemistry
Pam Marshall	Associate Professor	Genetics

**5. Additional Materials**

- A. Complete and attach the Appendix document.
- B. Provide one or more model programs of study (if appropriate).
- C. Attach other information that will be useful to the review committees and the Office of the Provost.

**PROVOST OFFICE APPROVAL(S)**

**This proposal has been approved by all necessary Provost office levels of review. I recommend implementation of the proposed organizational change.**

**Office of the University Provost**

**Signature**

**Date:**    /    /20

*Note: An electronic signature, email, or a PDF of the signed signature page is acceptable.*

## APPENDIX

### OPERATIONAL INFORMATION FOR UNDERGRADUATE CERTIFICATES

(This information is used to populate the Degree Search/catalog website.

Please consider the student audience in creating your text.)

A. **Proposed Certificate Name:**  
**Biomedical Research**

B. **Description (150 words maximum)**

The biomedical research certificate program offered by ASU's New College of Interdisciplinary Arts and Sciences at the West campus combines authentic research experience conducted in laboratories of practicing academic scientists with upper-division course work, including laboratory courses, that allow for specialization in given subject areas. The program is intended to serve students seeking competency in addressing scientific questions in the laboratory and prepares them to be highly competitive for careers in the research sector or to pursue graduate and professional schools, such as medical school.

C. **Contact and Support Information**

Building Name, code and room number: ( <a href="#">Search ASU map</a> )	FAB N100
Program office telephone number: ( <i>i.e.</i> 480/965-2100)	602/543-3000
Program Email Address:	mnsadvising@asu.edu
Program Website Address:	<a href="https://newcollege.asu.edu/mathematical-natural-sciences-degree-programs">https://newcollege.asu.edu/mathematical-natural-sciences-degree-programs</a>

D. **Program Requirements:** Provide applicable information regarding the program such as curricular restrictions or requirements, specific course lists, or academic retention requirements.

The biomedical certificate requires a minimum of 19 credit hours as outlined below.

Additional certificate requirements:

- Only courses in which a student receives a grade of "C" (2.00 on a 4.00 scale) or higher may be used to meet the certificate requirements.
- 12 credit hours must be taken at ASU.
- Nine credit hours must be counted toward the certificate alone and may not be shared with a student's BS or BA.

Required Core Courses (3 credit hours)

STP 280 Probability and Statistics for Researchers (3)

Certificate Elective Courses (12 credit hours)

BCH 371 Modern Concepts in Biochemistry (3)

BCH 372 Modern Concepts in Biochemistry Lab (1)

BIO 353 Cell Biology (3)

BIO 354 Cell Biology Lab (1)

BIO 360 Animal Physiology (3)

BIO 443 Applied Molecular Genetics and Genomics (3)

LSC 359 Animal Physiology Lab (1)

LSC 447 Molecular Genetics Lab (1)

MIC 443 The Microbial Universe (3)

MIC 444 The Microbial Universe Lab (1)

Other Certificate Requirements

LSC 499 Individualized Instruction (4)\*

OR

LSC 388 Research Fundamentals for the Natural Sciences (4)

\*Students will register for LSC 499 Individualized Instruction (2) in two consecutive semesters for a total of four credit hours (2 credits per semester).

Depending upon a student's undergraduate program of study, additional courses may need to be completed as prerequisites in order to complete the requirements of this certificate.

- E. **Additional Admission Requirements** If applicable list any admission requirements (freshman and/or transfer) that are higher than and/or in addition to the university minimum undergraduate admission requirements.)  
This certificate requires a 3.00 cumulative GPA in ASU course work and upper-division standing or graduate student status.

- F. **Delivery/Campus Information Delivery:** On-campus only (ground courses and/or iCourses)

*Note: Once students elect a campus or On-line option, students will not be able to move back and forth between the on-campus and the ASU Online options. Approval from the Office of the Provost and Philip Regier (Executive Vice Provost and Dean) is required to offer programs through ASU Online.*

G. **Campus/Locations:**

Indicate all locations where this program will be offered.

- Downtown Phoenix    Polytechnic    Tempe    Thunderbird    West   Other:





**MEMO**

Date: June 28, 2016

To: Marlene Tromp  
Dean, New College of Interdisciplinary Arts and Sciences

From: Lara Ferry  
Interim Director, School of Mathematical and Natural Sciences

On behalf of the School of Mathematical and Natural Sciences, I am submitting our proposal to establish a Certificate in Biomedical Research.

The proposal has received faculty approval through appropriate governance procedures in the School of Mathematical and Natural Sciences as well as relevant academic units throughout the university.

I have reviewed the proposal and verified that the proposal is complete and all supplemental materials are included.

Attachments: Proposal to Establish Certificate, Impact Statement from College of Liberal Arts and Sciences, College of Letters and Sciences, and College of Health Solutions.

**NEW COLLEGE OF INTERDISCIPLINARY ARTS & SCIENCES**

*MAILING ADDRESS: PO BOX 37100, PHOENIX, AZ 85069-7100*

*STREET/SHIPPING ADDRESS: 4701 W. THUNDERBIRD ROAD, GLENDALE, AZ 85306-4908*

*(602) 543-6000 FAX: (602) 543-6004*

## Stacey Kimbell

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**From:** Lara Ferry  
**Sent:** Monday, May 09, 2016 12:03 PM  
**To:** Stacey Kimbell  
**Subject:** Fwd: Pharmacology and Toxicology major/minor and Biomedical Research Certificate

This is the last of the impact statements for Pharm/Tox and the BioMed Research Certificate. Please upload this WITH the request that was sent from me to CLAS to CLAS, with CLAS's leadership responding sending it out to the various schools within CLAS from there. This will indicate that all parties within CLAS have been consulted, and SOLS has responded. Does that make sense?

Begin forwarded message:

**From:** Michael Angilletta <[ma@asu.edu](mailto:ma@asu.edu)>  
**Subject:** **Pharmacology and Toxicology major/minor and Biomedical Research Certificate**  
**Date:** May 9, 2016 at 11:40:55 AM MST  
**To:** Lara Ferry <[Lara.Ferry@asu.edu](mailto:Lara.Ferry@asu.edu)>

Hi Lara,

After conferring with my advisors, I have concluded that the proposed programs in Pharmacology and Toxicology major/minor and Biomedical Research Certificate will have little or no negative impacts on our undergraduate programs in the School of Life Sciences. Thus, we wish you success in your effort to develop these programs.

Best regards,  
Mike Angilletta

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**Michael J. Angilletta Jr.**

Professor & Senior Sustainability Scholar  
Associate Director of Undergraduate Programs

School of Life Sciences  
Arizona State University  
Tempe, AZ 85287

## Stacey Kimbell

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**From:** Lara Ferry  
**Sent:** Wednesday, April 13, 2016 8:20 AM  
**To:** Stacey Kimbell  
**Subject:** Fwd: Impact Statement Request for Biomedical Research Certificate

Begin forwarded message:

**From:** Keith Lindor <[Keith.Lindor@asu.edu](mailto:Keith.Lindor@asu.edu)>  
**Subject: Re: Impact Statement Request for Biomedical Research Certificate**  
**Date:** April 11, 2016 at 1:19:13 PM MST  
**To:** Lara Ferry <[Lara.Ferry@asu.edu](mailto:Lara.Ferry@asu.edu)>  
**Cc:** Julie Liss <[JULIE.LISS@asu.edu](mailto:JULIE.LISS@asu.edu)>

Lara, I certainly would support this. I have copied Julie Liss, our Associate Dean for Academic Affairs for her opinion, too.

Sent from my iPad

On Apr 11, 2016, at 3:24 PM, "Lara Ferry" <[Lara.Ferry@asu.edu](mailto:Lara.Ferry@asu.edu)> wrote:

Hello again Dean Lindor-

I'm writing again to solicit an impact statement regarding our proposed Biomedical Research Certificate here in the School of Mathematical and Natural Sciences. I have sent this under separate heading from the Pharm/Tox proposal for ease in routing to the proper units.

I append here for your review the proposal and associated attachments.

Thank you kindly for your assistance!

Best,

Lara Ferry, PhD  
Interim Director & Professor, School of Mathematical & Natural Sciences  
Honors Faculty, Barrett The Honors College

Arizona State University  
Mailing Address (letters): PO Box 37100, MC 2352 • Phoenix, AZ 85069  
Shipping Address (packages): 4701 W. Thunderbird Rd, FAB N137 •  
Glendale, AZ 85306  
Office: FAB N153 • (602) 543-2817  
Research Website: <http://morphology.asu.edu>

<BioMedRes\_Cert.pdf>

## Stacey Kimbell

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**From:** Lara Ferry  
**Sent:** Wednesday, April 13, 2016 8:20 AM  
**To:** Stacey Kimbell  
**Subject:** Fwd: Impact Statement Request for Biomedical Research Certificate

Begin forwarded message:

**From:** Duane Roen <[Duane.Roen@asu.edu](mailto:Duane.Roen@asu.edu)>  
**Subject: RE: Impact Statement Request for Biomedical Research Certificate**  
**Date:** April 9, 2016 at 7:08:16 PM MST  
**To:** Lara Ferry <[Lara.Ferry@asu.edu](mailto:Lara.Ferry@asu.edu)>, Paul LePore <[Paul.Lepore@asu.edu](mailto:Paul.Lepore@asu.edu)>

Lara,

The College of Letters and Sciences is happy to support your proposal for a Biomedical Research Certificate. It looks exciting.

Please let me know if you need anything else.

Best,  
Duane

Duane Roen  
Vice Provost, Polytechnic campus  
Dean, College of Letters and Sciences  
Dean, University College  
Arizona State University  
480-727-6513  
[duane.roen@asu.edu](mailto:duane.roen@asu.edu)

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**From:** Lara Ferry  
**Sent:** Thursday, April 07, 2016 11:14 AM  
**To:** Paul LePore <[Paul.Lepore@asu.edu](mailto:Paul.Lepore@asu.edu)>; Duane Roen <[Duane.Roen@asu.edu](mailto:Duane.Roen@asu.edu)>  
**Subject:** Impact Statement Request for Biomedical Research Certificate

Hello Paul and Duane-

I'm writing again to solicit an impact statement regarding our proposed Biomedical Research Certificate here in New College (School of Mathematical and Natural Sciences). I have sent this under separate heading from the Pharm/Tox proposal for ease in routing to the proper schools.

I append here for your review the proposal and associated attachments.

Thank you kindly for your assistance!

Best,

Lara Ferry, PhD

Interim Director & Professor, School of Mathematical & Natural Sciences  
Honors Faculty, Barrett The Honors College

Arizona State University

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