Executive Summary

Request for Authorization to Implement Undergraduate Minor in Population Health Data Science

<table>
<thead>
<tr>
<th>Requested by</th>
<th>Department of Epidemiology and Biostatistics, Mel &amp; Enid Zuckerman College of Public Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIP Code</td>
<td>27.0599: Statistics, Other.</td>
</tr>
<tr>
<td>Purpose of Program</td>
<td>The Population Health Data Science minor will introduce students to the fundamentals of data science in the health sciences. Data science is emerging as a leading area for job growth over the next decade in the health sector. Expansion of health data sources, including electronic medical records and non-traditional health surveillance data necessitate the training of individuals who have an understanding both of the underlying dynamics of health and medicine and also skills in how to manage, analyze, interpret big data, and collaborate with higher level data scientists. We envision providing students with an introduction to the basics of how to apply data science to population health questions. The minor will be administered to be accessible both to individuals coming from the health fields including nursing, pharmacy, and medicine to learn about data science and for those coming from data science, math, computer science, neuroscience, and other disciplines to learn how to address issues in public health using appropriate data science tools. Students must have a minimum 2.5 cumulative GPA and completion of college algebra or a higher level MATH course to declare the minor. The 18 unit minor consists of 6 required courses including introduction to epidemiology, introduction to biostatistics, health data acquisition and assessment, health data management and visualization, health data analysis and communication methods, and health data science practice. Students completing the minor will be able to: 1. Explain the role of data science in public health. 2. Identify key sources of health data (e.g., surveillance data, medical records, state/national/international surveys, hospital discharge). 3. Implement data management and quality control techniques for at least one data entry system commonly used in healthcare and health research (e.g., Qualtrics, REDCap). 4. Execute dataset integration and conduct basic statistical analyses on existing datasets. 5. Assess limitations in data collection, management, and analysis as it impacts quality; interpret findings accordingly. 6. Communicate analytic findings – in oral and written format – including easily interpretable graphics to convey findings.</td>
</tr>
<tr>
<td>5-year projected annual enrollment</td>
<td></td>
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<td>-----------------------------------</td>
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<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; year</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; year</td>
</tr>
<tr>
<td>30</td>
<td>60</td>
</tr>
</tbody>
</table>

**Source(s) of Funding**
- Continuing Sources: UG RCM Revenue
- Expenditure Items:
  - Anticipate adding at least one additional faculty member
  - Data coordinator

**Approvals:**
- ABOR: N/A
- Undergraduate Council: 09/10/2019
- Graduate Council: N/A
- CAAC: 08/27/2019
- Provost’s Council: 09/23/2019
- Faculty Senate

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For use by Curricular Affairs:
- [ ] Create approval memo
- [ ] Send memo to college/dept and acad_org listserv
- [ ] Create UAccess Plan Table code(s) (secondary?)
- [ ] Upload approval memo and proposal documents to UAccess Plan Table
- [ ] Notify acad_org of the plan code creation
- [ ] Notify ADVIP team
- [ ] Update API, if necessary
New Academic Program Workflow Form

General

Proposed Name: Population Health Data Science
Transaction Nbr: 00000000000029
Plan Type: Minor
Academic Career: Undergraduate
Degree Offered:
Do you want to offer a minor?  N
Anticipated 1st Admission Term: Sprg 2020

Details

Department(s):

PBLH

<table>
<thead>
<tr>
<th>DEPTMNT ID</th>
<th>DEPARTMENT NAME</th>
<th>HOST</th>
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</thead>
<tbody>
<tr>
<td>4204</td>
<td>Epidemiology and Biostatistics</td>
<td>Y</td>
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Campus(es):

MAIN

<table>
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<tr>
<th>LOCATION</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>TUCSON</td>
<td>Tucson</td>
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</table>

Admission application terms for this plan: Spring: Y Summer: N Fall: Y

Plan admission types:
Freshman: N Transfer: N Readmit: N Graduate: N
Non Degree Certificate (UCRT only): N
Other (For Community Campus specifics): Y

We will admit students who are in their sophomore/junior year into the program.

Plan Taxonomy: 27.0599, Statistics, Other.
Conditions for Admission/Declaration for this Major:
At the declaration of this minor, a minimum cumulative GPA of 2.5 is required. Course prerequisites to the program include:
- College Algebra (e.g. MATH 112) or a higher level MATH course.

Requirements for Accreditation:
N/A

Program Comparisons

University Appropriateness
The minor in Population Health Data Science aligns well with the strategic plan of the University of Arizona and the College of Public Health

The first pillar of the strategic plan (October 2018), "The Wildcat Journey: Driving Student Success for a Changing World." This pillar emphasizes the need to prepare students for our rapidly evolving workplace. This includes specific reference to the need for students to have skills in big data analysis and advanced analytical tools. Our minor will provide students not only with skills to handle large public health data sources but will further develop their understanding of the origin of these data and how they can interpret the information that is being produced and how the results can be communicated to a broader audience. This communication to stakeholders is critical, particularly in a land grant institution such as the University of Arizona. We will further illustrate this pillar using active and student-centered teaching that engages students in project-based coursework.

In Pillar 2, emphases are placed on both health and the development of innovative strategies to use big data. The minor proposed will integrate both concepts and provide students with the fundamental concepts that they can use to pursue further graduate work in these areas or entry level careers in health data science.

The University of Arizona is home to a growing number of initiatives in data science; including a new major started in the Mathematics Department, Data7, the University of Arizona Center on Data Science which is also connected with
the UA Transdisciplinary Research in Principles of Data Science (TRIPODS) initiative. There are significant investments in infrastructure for high level computing that are in place that could be leveraged by the minor including CyVerse which provides a platform for data storage, bioinformatics tools, image analysis and cloud services. UA Research Computing further provides services in high performance/high throughput computing systems, software, and research data storage. These resources can be used by students to obtain further consultation in data visualization and statistical consulting.

The Population Health Data Science minor also aligns well with objectives in the College of Public Health Strategic plan. Our number one listed objective in undergraduate education is "Objective 1: Expand the options of education for undergraduate students to include additional tracks in the current program (such as Infectious diseases, global health, management of health data, and health education)." The planned undergraduate minor takes this basic concept of management of health data and modernizes it to reflect the growing interest in population health data science. With the growth of medical records and other big data sources, it is critical that disciplines such as biostatistics and epidemiology have a role in developing best practices for how to analyze and interpret data that are not traditionally set up as research data.

This minor also aligns with priority research directions in the college which are outlined to expand our footprint in "Health Informatics, Biostatistics, and Evaluation. The faculty have expertise in managing large datasets; provides expertise in the resources, devices, and methods required to optimize the acquisition, storage, retrieval, and use of information in health and biomedicine (including EMRs); assists with study design, methodology, and analysis; provides technical support for research IT systems, and evaluation for state, city and county programs. (related to the University's focus on biological and biomedical systems, and technology and society)."

Arizona University System

<table>
<thead>
<tr>
<th>NBR</th>
<th>PROGRAM</th>
<th>DEGREE</th>
<th>#STDNTS</th>
<th>LOCATION</th>
<th>ACCRDT</th>
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</thead>
</table>

Peer Comparison

The proposed undergraduate minor in population health data science has been developed to push beyond what is typically covered in data science minors. While comparison programs focus almost explicitly on the methods that will be undertaken with data that is available, we emphasize the need to understand the origin of the data and the strengths and limitations of analyses that can be conducted. Further, our focus on health provides a content perspective that is absent in other data science minor programs. Other program courses are agnostic to content which is very important in health analyses given the potential consequences of incorrect assumptions. Despite these differences, many of the methods that will be covered in the proposed minor are also covered in
comparison minors, including a heavy emphasis on statistical methodologies and data mining.

**Faculty & Resources**

**Faculty**

Current Faculty:

<table>
<thead>
<tr>
<th>INSTR ID</th>
<th>NAME</th>
<th>DEPT</th>
<th>RANK</th>
<th>DEGREE</th>
<th>FCLTY/%</th>
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<tbody>
<tr>
<td>08909093</td>
<td>Zhao Chen</td>
<td>4204</td>
<td>Professor</td>
<td>Doctor of Philosophy</td>
<td>10.00</td>
</tr>
<tr>
<td>16900187</td>
<td>Kacey Ernst</td>
<td>4204</td>
<td>Assoc. Prof</td>
<td>Doctor of Philosophy</td>
<td>15.00</td>
</tr>
<tr>
<td>14306246</td>
<td>Chiu-Hsieh Hsu</td>
<td>4204</td>
<td>Professor</td>
<td>Doctor of Philosophy</td>
<td>15.00</td>
</tr>
<tr>
<td>22052139</td>
<td>Heidi Brown</td>
<td>4204</td>
<td>Assit. Prof</td>
<td>Doctor of Philosophy</td>
<td>10.00</td>
</tr>
<tr>
<td>22079316</td>
<td>Leslie Farland</td>
<td>4204</td>
<td>Assit. Prof</td>
<td>Doctor of Philosophy</td>
<td>10.00</td>
</tr>
<tr>
<td>22079771</td>
<td>Xiaoxiao Sun</td>
<td>4204</td>
<td>Assit. Prof</td>
<td>Doctor of Philosophy</td>
<td>10.00</td>
</tr>
<tr>
<td>02196716</td>
<td>Shikhar Kumar</td>
<td>4204</td>
<td>Lecturer</td>
<td>Doctor of Philosophy</td>
<td>10.00</td>
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Additional Faculty:

We would like to have at least one additional faculty member hired to assist in teaching this minor as many of the current faculty involved are already teaching the expected workload. They are dedicated to building the program and will work towards developing and refining the curriculum until the point when student numbers are high enough to support the hiring of additional faculty.

**Current Student & Faculty FTE**

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<th>DEPARTMENT</th>
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**Projected Student & Faculty FTE**

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<tr>
<td>4204</td>
<td>0</td>
<td>92</td>
<td>19.00</td>
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</tbody>
</table>

**Library**

Acquisitions Needed:

We contacted and discussed the minor with our COPH librarian. At this time we do not need additional library resources for the minor.
Physical Facilities & Equipment

Existing Physical Facilities:

We have office space for the faculty that will be involved in the program.

We will use existing classroom space. We will make use of the classroom that has a computer lab on the third floor of the College of Public Health which seats approximately 30 students. This will be sufficient for the first several years as the program grows. We anticipate that we will need to move to the larger space and will obtain classroom space in the co-laboratories in the new Health Sciences Innovation Building which provides large and medium spaces for team learning areas. Team learning will be at the core of several of the required minor courses making this an ideal learning environment for the students.

Additional Facilities Required & Anticipated:

None anticipated.

Other Support

Other Support Currently Available:

None anticipated.

Other Support Needed over the Next Three Years:

A data coordinator to assist with the management of the data across the four population health science minor courses.

Comments During Approval Process

3/6/2019 11:08 AM
KERNST

<table>
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3/17/2019 12:56 PM
KERNST

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5/15/2019 1:24 PM
PCHHSU

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<tbody>
<tr>
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<tr>
<td>Comments</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Added comparison summary provided by KERNST to Program Comparisons -Peer Comparison field.</td>
</tr>
</tbody>
</table>
I. PURPOSE AND NATURE OF THE MINOR—provide a description for the proposed minor. Include the purpose, nature, and highlights. The description should match departmental and college websites, handouts, promotional materials, etc.

The vision of the minor, Population Health Data Science, is to introduce students to the fundamentals of data science in the health sciences. Data science is emerging as a leading area for job growth over the next decade in the health sector. Expansion of health data sources, including electronic medical records and non-traditional health surveillance data necessitate the training of individuals who have an understanding both of the underlying dynamics of health and medicine and also skills in how to manage, analyze, interpret big data, and collaborate with higher level data scientists. We envision providing students with an introduction to the basics of how to apply data science to population health questions. The minor will be administered to be accessible both to individuals coming from the health fields including nursing, pharmacy, and medicine to learn about data science and for those coming from data science, math, computer science, neuroscience, and other disciplines to learn to about how to address issues in public health using appropriate data science tools.
II. MINOR REQUIREMENTS—complete the table below to list the minor requirements, including minimum number of credit hours, required core, electives, and any special requirements. Note: information in this section must be consistent throughout the proposal documents (comparison charts, department checklists, curricular/assessment map, etc.). Delete the EXAMPLE column before submitting/uploading.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Details</th>
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<tbody>
<tr>
<td>Total units required to complete minor</td>
<td>18</td>
</tr>
<tr>
<td>Upper-division units required</td>
<td>18</td>
</tr>
<tr>
<td>Total transfer units that may apply to minor</td>
<td>0</td>
</tr>
<tr>
<td>List any special requirements to declare or gain admission to this minor (completion of specific coursework, minimum GPA, interview, application, etc.)</td>
<td>At the declaration of this minor, a minimum cumulative GPA of 2.5 is required*. Course prerequisites to the program include: -College Algebra (e.g. MATH 112) or a higher level MATH course.</td>
</tr>
<tr>
<td>Minor requirements (list all required major coursework including core and electives). Courses listed must include course prefix, number, units, and title. Mark new coursework (New). Include any limits/restrictions needed (house number limit, etc.). Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department.</td>
<td>EPID 309: Introduction to Epidemiology (3) or content equivalent courses BIOS 376: Introduction to Biostatistics (3) or content equivalent courses EPID/BIOS 450: Health Data Acquisition and Assessment (3) BIOS/EPID: 451: Health Data Management and Visualization (3) BIOS/EPID: 452: Health Data Analysis and Communication Methods (3) EPID/BIOS453: Health Data Science Practice (3)</td>
</tr>
<tr>
<td>Internship, practicum, applied course requirements (Yes/No. If yes, provide description)</td>
<td>BIOS: 453 (NEW): Health Data Science Practice (3)</td>
</tr>
<tr>
<td>Additional requirements (provide description)</td>
<td>None</td>
</tr>
<tr>
<td>Any double-dipping restrictions? (Yes/No. If yes, provide description)</td>
<td>Yes. Public health majors cannot also be in the Population Health Data Science Minor.</td>
</tr>
</tbody>
</table>

*GPA 2.5 requirement justification: current undergraduate public health major requires a minimum GPA of 2.5. Given the intensity and level of the coursework required for the Population Health Data Science Minor and our dedication to success of students in the minor, we are requiring a minimum 2.5 GPA to enter the minor.
III. **CURRENT COURSES**—using the table below, list existing courses included in the proposed program. If the courses listed belong to a department that is not a signed party to this implementation request, upload the department head’s permission to include the courses in the proposed program and information regarding accessibility to and frequency of offerings for the course(s). Upload letters of support/emails from department heads to the “Letter(s) of Support” field on the UAccess workflow. Add rows to the table, as needed.

<table>
<thead>
<tr>
<th>Course prefix and number (include cross-listings)</th>
<th>Units</th>
<th>Title</th>
<th>Course Description</th>
<th>Pre-requisites</th>
<th>Modes of delivery (online, in-person, hybrid)</th>
<th>Typically Offered (F, W, Sp, Su)</th>
<th>Dept signed party to proposal? (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPID 309</td>
<td>3</td>
<td>Introduction to Epidemiology</td>
<td>This course will introduce students to basic principles and methods used in epidemiology. The course will include basic research designs, estimating outcome measures, and establishing cause and effect and effectiveness of interventions to prevent and cure disease</td>
<td>Math 112 or higher</td>
<td>In-person and online</td>
<td>F, Sp</td>
<td>Yes</td>
</tr>
<tr>
<td>BIOS 376</td>
<td>3</td>
<td>Introduction to Biostatistics</td>
<td>This course introduces biostatistical methods and applications, covering descriptive statistics, probability, and inferential techniques necessary for appropriate analysis and interpretation of data relevant to health sciences. Students will use a statistical software package.</td>
<td>Math 112 or higher</td>
<td>In-person, online</td>
<td>F, Sp</td>
<td>Yes</td>
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</tbody>
</table>
IV. **NEW COURSES NEEDED** – using the table below, list any new courses that must be created to initiate the minor. If specific course number is undetermined, please provide level, (ie CHEM 4**). Add rows as needed. Is a new prefix needed? If so, provide the subject description so Curricular Affairs can generate proposed prefix options.

All of the courses below, have already been approved and will be offered in the semester indicated below for the first year.

<table>
<thead>
<tr>
<th>Course prefix and number (include cross-listings)</th>
<th>Units</th>
<th>Title</th>
<th>Course Description</th>
<th>Pre-requisites</th>
<th>Modes of delivery (online, in-person, hybrid)</th>
<th>Status*</th>
<th>Anticipated first term offered</th>
<th>Typically Offered (F, Sp, Su)</th>
<th>Dept signed party to proposal? (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPID/BIOS 450</td>
<td>3</td>
<td>Health Data Acquisition and Assessment</td>
<td>Students learn how to identify and acquire medical and health data, assess quality, and integrate data from multiple sources. Students gain knowledge of how data collection procedures influence data quality and techniques for combining health datasets. Students gain skills by completing applied projects to collect, access and work with existing health data.</td>
<td>EPID 309 and BIOS 376. Junior and senior status.</td>
<td>In-person</td>
<td>Approved</td>
<td>Fall 2019</td>
<td>F</td>
<td>Yes</td>
</tr>
<tr>
<td>BIOS/EPID 451</td>
<td>3</td>
<td>Health Data Management and Visualization</td>
<td>Students learn how to identify and acquire medical and health data, assess quality, and integrate data from multiple sources. Students gain knowledge of how data collection procedures influence data quality and techniques for combining health datasets. Students gain skills by completing EPID 309 and BIOS 376</td>
<td>In-person</td>
<td>Approved</td>
<td>Fall 2019</td>
<td>F</td>
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<tr>
<td>Course</td>
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<td>Prerequisite</td>
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<td>Semester</td>
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<tr>
<td>BIOS 452</td>
<td>3</td>
<td>Health Data Analysis and Communication Methods</td>
<td>This course bridges the concepts learned in introduction to epidemiology and biostatistics courses to teach students the skills to identify and implement the appropriate statistical methods to answer public health and biomedical research questions based on study and sampling designs. Students apply these skills to large public health and biomedical databases. Students learn how to present their results graphically and through the use of social media (e.g. YouTube) to communicate findings to lay audiences.</td>
<td>EPID 309 and BIOS 376</td>
<td>In-person</td>
<td>Spring 2020</td>
<td>Yes</td>
<td>F</td>
<td>Yes</td>
</tr>
<tr>
<td>EPID/ BIOS 453</td>
<td>3</td>
<td>Health Data Science Practice</td>
<td>This course will provide a culminating research experience that tests all competencies through a hands-on semester-long project-based research course. This course will allow students to immerse themselves in a health data science project in public health and biomedical science. This project will entail a review of the current evidence-base for their specific research</td>
<td>The other 5 required courses</td>
<td>In-person</td>
<td>Fall 2020</td>
<td>Yes</td>
<td>F</td>
<td>Yes</td>
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<tr>
<td>question and use the skills developed in the previous courses to assess and analyze public health data and communicate findings to the public.</td>
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</table>

*In development (D); submitted for approval (S); approved (A)*

Subject description for new prefix (if requested). Include your requested prefix, if any.
V. **STUDENT LEARNING OUTCOMES AND CURRICULUM MAP**—describe what students should know, understand, and/or be able to do at the conclusion of this minor. Work with Office of Instruction and Assessment to create a curricular map using Taskstream. Include your curricular map in this section (refer to Appendix B for sample Curriculum Map).

The competencies below and the Curriculum Map in Appendix B describe what students should know, understand, and be able to do at the conclusion of this minor.

**Competencies**

1. Explain the role of data science in public health.
2. Identify key sources of health data (e.g., surveillance data, medical records, state/national/international surveys, hospital discharge).
3. Implement data management and quality control techniques for at least one data entry system commonly used in healthcare and health research (e.g., Qualtrics, REDCap).
4. Execute dataset integration and conduct basic statistical analyses on existing datasets.
5. Assess limitations in data collection, management, and analysis as it impacts quality; interpret findings accordingly.
6. Communicate analytic findings – in oral and written format – including easily interpretable graphics to convey findings.
Curriculum Map:

**Figure 1. Competency mapping for the Population Health Data Science Undergraduate Minor**

<table>
<thead>
<tr>
<th>Courses and Learning Activities</th>
<th>Outcome 1</th>
<th>Outcome 2</th>
<th>Outcome 3</th>
<th>Outcome 4</th>
<th>Outcome 5</th>
<th>Outcome 6</th>
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<tr>
<td>BIOS 378 Class assignments</td>
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</table>

**Program Outcome Assessment Activities**

| BIOS 4XX project based work      | A         | A         | A         | A         | A         | A         |
| Student Survey Student Survey (Indirect) | A     | A         | A         | A         | A         | A         |

**Legend:**
- I: Introduced
- P: Practiced
- A: Assessed

Last Modified: 01/09/2019 09:07:15 AM
VI. ASSESSMENT PLAN FOR STUDENT LEARNING - using the table below, provide a schedule for program assessment of intended student learning outcomes 1) while students are in the program and 2) after completion of the minor. Add rows as needed. Delete EXAMPLE row.

<table>
<thead>
<tr>
<th>Learning Outcomes</th>
<th>Sources(s) of Evidence</th>
<th>Assessment Measures</th>
<th>Data Collection Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome 1: Able to explain the role of data science in public health</td>
<td>Course-embedded assessments</td>
<td>Exams, homework and project presentation, pre-assessment, post-program assessment</td>
<td>At time of selection of the minor, End of each course, End of the minor</td>
</tr>
<tr>
<td>Outcome 2: Identify key sources of health data</td>
<td>Course-embedded assessments</td>
<td>Homework and project presentation, pre-assessment, post-program assessment</td>
<td>At time of selection of the minor, End of each course, End of the minor</td>
</tr>
<tr>
<td>Outcome 3: Implement data management and quality control techniques for at least one data entry system commonly used in healthcare and health research</td>
<td>Course-embedded assessments</td>
<td>Homework, pre-assessment, post-program assessment</td>
<td>At time of selection of the minor, End of BIOS 451, End of the minor</td>
</tr>
<tr>
<td>Outcome 4: Execute dataset integration and conduct basic statistical analyses on existing datasets</td>
<td>Course-embedded assessments</td>
<td>Exams, homework and project report and presentation, pre-assessment, post-program assessment</td>
<td>At time of selection of the minor, End of BIOS 376, EPID 450, BIOS 452, and BIOS 4xx, End of the minor</td>
</tr>
<tr>
<td>Outcome 5: Assess limitations in data collection, management, and analysis as it impacts quality; interpret findings accordingly</td>
<td>Course-embedded assessments</td>
<td>Homework and project report and presentation, pre-assessment, post-program assessment</td>
<td>At time of selection of the minor, End of each course, End of the minor</td>
</tr>
<tr>
<td>Outcome 6: Effectively communicate analytic findings</td>
<td>Course-embedded assessments</td>
<td>Homework and project report and presentation, pre-assessment, post-program assessment</td>
<td>At time of the selection of the minor, End of BIOS 376, BIOS 452, and BIOS 4xx, End of the minor</td>
</tr>
</tbody>
</table>

In addition, as indicated in the curriculum map, students complete the minor will be given a self-assessment survey (Appendix B) to collect feedback on each of the outcomes at the beginning of the program and on completion of the minor.
VII. **NEED FOR THE MINOR**—describe how the minor fulfills the needs of the city, state, region, and nation. Provide market analysis data or other tangible evidence of the need for and interest in the proposed program. This might include results from surveys of current students, alumni, and/or employers or reference to student enrollments in similar programs in the state or region. Include an assessment of the employment opportunities for graduates completing the minor during the next three years.

According to the report on [DataScience Community](https://www.datasciencecommunity.org), as of today there are over 400 data science programs (including bachelor, certificate and graduate programs) in the US. Due to the interdisciplinary nature of data science, most of the existing data science programs (over 90%) are either a certificate or graduate program across the nation. There are only a few programs at the undergraduate level. This indicates there is a great need to create more undergrad data science programs and echoes the report of data science for undergraduates released by the National Academy of Sciences (2018) which stated “[Data Science for Undergraduates: Opportunities and Options](https://www.nationalacademies.org/digest.aspx?digestID=257)” . As a result, there are an increasing number of schools creating data science programs at the undergraduate level, including the University of Arizona. However, the main subject of their focus is on business, computer science or statistics. We could not find any comparable programs that focus on public health or biomedical science at the undergraduate level. The recently approved undergraduate data science program at the University of Arizona mainly focuses on statistics and computer science. Our proposed minor will focus on introducing these concepts and applications in public health and medicine. “

There is an increasing need for both health professionals who have a background in data science and data scientists with a focus on health applications. Hence, it is essential to create an undergraduate data science minor at the University of Arizona which focuses on public health and biomedical science for students who would like to pursue a data scientist job in the health sector. In addition, this minor can be used as one of the minors for students who major in statistics and data science and are interested in public health and biomedical research. Pursuing this minor will allow them to develop data science skills in a specific content area. This minor can also prepare undergraduate students who would like to enter a quantitative graduate program in public health or biomedical area like data science or epidemiology.

We conducted key informant interviews with personnel from four health departments (Maricopa County, Pima County, Yuma County, and the State of Arizona) regarding skillsets that would be desired for entry level public health departments. Several key themes were noted during these interviews. 1) data literacy, including the management of large datasets, data entry, and ensuring data quality, 2) communication of findings from analyses to the general public through interpretable graphs and figures. The second skillset was heavily emphasized as public communication is a new criteria for becoming an accredited health department. Staff at Arizona Department of Health Services are already being trained in analytical results visualization on the job.
In April 2018, we developed an interest survey in Qualtrics and disseminated it to students in public health, math, computer science, economics, psychology, neuroscience, physiology, and pre-public health majors (see Appendix A. Survey Tool and Appendix B. Result Summary). This survey was developed to identify interest in population health data science as both a minor and a sub-plan in the public health major which was approved in Spring 2019. We received 169 responses to the survey. While this is unlikely a truly representative sample, of those that responded, approximately 75% of the responses were moderately to extremely interested (moderately interested (38%), very interested (19%), extremely interested (17%). The majority of respondents (58%) indicated they would be willing to take a computer programming course before taking the course with 10% indicating they already had programming skills. Comments on the survey included, “I wish this minor existed earlier!”, “This minor sounds like a great idea, my only regret is that I'll have graduate by the time it is an option.”, and “I am graduating but I would have 100000% done this minor. Looking for jobs now I really think this would have been an amazing asset to my learning here.”

This minor will complement the growing initiatives in data science on campus. The Data Science Institute (https://datascience.arizona.edu/) and UA Transdisciplinary Research in Principles of Data Science (TRIPODS; http://tripods.arizona.edu/) are two initiatives on campus that encourage interdisciplinary training and research in data science. The mathematics department has recently developed a major in statistics and data science that will immerse students in the statistics and computer science. This major does not specify the subject area in terms of where the data came from. The minor we intend to create will complement the major in statistics and data science very well especially for those students who are interested in public health or biomedical research. The Population Health Data Science minor will complement the Quantitative Methods sub-plan that is available for public health majors. The Quantitative Methods sub-plan was approved in Spring 2019 and includes the four core courses for the minor; 450, 451, 452, 453.
VIII. **ANTICIPATED STUDENT ENROLLMENT**-complete the table below. What concrete evidence/data was used to arrive at the numbers?

<table>
<thead>
<tr>
<th>5-YEAR PROJECTED ANNUAL ENROLLMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of minors</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Data/evidence used to determine projected enrollment numbers:
We expect that this will be a relatively small program that attracts high quality students who are strongly quantitative. We anticipate that we will attract students from several key programs, based on the results of our surveys conducted with other departments. We conducted a survey with a convenience sample of undergraduate students (n = 169). Most were from the undergraduate major in public health (n = 116). However, we received responses from (n= 53) students who were in majors outside of public health. These majors included math, economics, bioinformatics, physiology, neuroscience, veterinary sciences, and information science and society. Of these students, approximately 1/3rd (n = 19) indicated they were very or extremely interested in the minor objectives and over a third (37.8%) were moderately interested in the program. A similar distribution was seen in the public health majors that responded with 36% (n = 42) indicating they were very or extremely interested in the minor. While these respondents are likely not fully representative of students in the majors that they come from, the survey demonstrates that there is broad interest in the minor both within the College of Public Health and externally in other departments.

The following were enrollment tables for several of the key targeted majors for the Public Health Data Science Minor:

<table>
<thead>
<tr>
<th>Major</th>
<th>Major Students_Fall 2017</th>
<th>Require Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
<td>479</td>
<td>yes - from a list of 4 minors</td>
</tr>
<tr>
<td>Econ</td>
<td>610</td>
<td>yes</td>
</tr>
<tr>
<td>Business Econ</td>
<td>113</td>
<td>no</td>
</tr>
<tr>
<td>Comp Sci</td>
<td>375</td>
<td>no</td>
</tr>
<tr>
<td>Bioinformatics</td>
<td>20</td>
<td>no</td>
</tr>
<tr>
<td>Information Science and eSociety</td>
<td>156</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1753</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total that require a minor</strong></td>
<td><strong>1245</strong></td>
<td></td>
</tr>
</tbody>
</table>

Using the most conservative of estimates, we will include only those individuals who 1) responded to the survey and 2) indicated they were very or extremely interested as the
starting enrollment for the minor (n = 61) and divide it by half, given that these individuals are in different years of their programs (n = 30). We anticipate growth to increase dramatically as the minor is marketed more broadly across campus.

IX. **ANTICIPATED MINORS AWARDED** - complete the table below, beginning with the first year in which minors will be awarded. How did you arrive at these numbers?

<table>
<thead>
<tr>
<th>PROJECTED MINORS AWARDED ANNUALLY</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>4th Year</th>
<th>5th Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of awarded minors</td>
<td>18</td>
<td>36</td>
<td>44</td>
<td>66</td>
<td>72</td>
</tr>
</tbody>
</table>

Data/evidence used to determine number of anticipated minors awarded annually: Given the highly quantitative nature of the coursework involved we anticipate some attrition (up to 40%). This number was chosen as studies on attrition in STEM fields is around 40% overall, however the students who enter the minor will be late sophomore or juniors and may be more likely to have a strong quantitative background already given the majors we feel will be the primary contributors of students to this minor (Math, Computer Science, Economics).
X. **PROGRAM DEVELOPMENT TIMELINE** - describe plans and timelines for 1) marketing the minor and 2) student recruitment activities.

All of the new courses required for the minor have been fully approved and we anticipate the minor starting spring 2020. We are developing a PowerPoint presentation and video clip on the making of the Population Health Data Science program. The presentation will explain why the minor is needed, the objectives, domain area and curriculum of the minor, and how the minor will improve student’s data skills for health sciences. It will be provided to the programs with students who might be interested in being a data analyst in the health sector (e.g. MIS, MATH and COMM) and will also be posted on the website of the College of Public Health serving as the marketing tool. After the presentation is generated and distributed, the College of Public Health director for undergraduate advising will distribute the program marketing materials to colleagues across campus for student recruitment. In addition, the faculty members who teach EPID 309 and BIOS 376 (courses that are currently completed by students from across campus majors) will highlight the minor program in their courses. Faculty in the minor program will also conduct undergraduate seminar at various programs to recruit students into the minor.
XI. **DIVERSITY AND INCLUSION**—describe how you will recruit diverse students and faculty to this minor.

Approximately one-third of respondents to the student survey were under-represented minority (URM) populations as defined as race/ethnic minorities (Hispanic or Latino \( n = 43 \), African American or Black \( n = 6 \), American Indian or Alaskan Native \( n = 5 \)) (54 out of the 158 that reported their race/ethnicity). Of these URM students, 43\% \( n = 23 \) indicated they were very or extremely interested (VEI) in the minor program. This is a higher level of interest than was indicated overall. In addition, the overwhelming proportion of students that responded to the survey were female, likely mirroring the heavily skewed female demographic of the highest response rate being individuals with a public health major. While females accounted for a higher proportion of the sample, females indicated somewhat lower rates of interest than males (36\% VEI females \( n = 103 \) vs. 43\% VEI males \( n = 30 \)). Our response rate for non-binary genders was too low to interpret \( n = 2 \). This indicates that there is interest in a diverse group of students that are targeted for increasing enrollment in STEM fields.

Faculty teaching in the program are a combination of both junior and senior faculty members. Each course will be taught by an epidemiologist and biostatistician providing diverse perspectives. Underrepresented in STEM fields, female faculty make up over half of the instructors involved in the courses. Currently our department does not have URM faculty (as defined by race/ethnicity and/or gender minorities). We have a strategic plan in the Department that includes recruitment of a more diverse faculty.

We will seek to attract and retain diverse students through several strategies: 1) we will recruit from within our college of public health which is one of the most diverse undergraduate majors on campus, 2) we will deliver inclusive curriculum (for example, we will discuss how underserved minority populations and women may be differentially represented in large data sources and how this issue can impact interpretability and utility of different data sources), and 3) we will identify resources outside of the classroom, peer mentoring groups, after-hours analytical support that will enhance the retention of all students enrolled in the program.
Appendix A. Faculty CV. Complete the table below by providing UA Vitae profile link or short CV for each faculty member participating in the proposed program. Add rows as needed. UA Vitae profiles can be found in the UA directory/phonebook.

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>UA Vitae link or “CV attached”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heidi Brown</td>
<td>CV attached</td>
</tr>
<tr>
<td>Zhao Chen</td>
<td>CV attached</td>
</tr>
<tr>
<td>Kacey Ernst</td>
<td>CV attached</td>
</tr>
<tr>
<td>Leslie Farland</td>
<td>CV attached</td>
</tr>
<tr>
<td>Chiu-Hsieh (Paul) Hsu</td>
<td>CV attached</td>
</tr>
<tr>
<td>Shikhar Kumar</td>
<td>CV attached</td>
</tr>
<tr>
<td>Xiaoxiao Sun</td>
<td><a href="https://profiles.arizona.edu/person/xiaosun">https://profiles.arizona.edu/person/xiaosun</a></td>
</tr>
</tbody>
</table>
Appendix B. Indirect Assessment of Population Health Data Science Minor Competencies

The following draft survey will be administered to students on declaration of the minor and on completion of minor coursework to indirectly assess progress towards competencies.

On a scale of 1 to 5 from not confident to confident, how confident do you feel with the following tasks:

1  2  3  4  5

Not confident    Confident

1. Explaining the role of data science in public health
2. Explaining how data science interfaces with epidemiology, biostatistics, computer science, and public health
3. Identifying key sources of health data
4. Discussing the strengths and limitations of different sources of health data
5. Implementing data management and quality control techniques for one data entry system commonly used in healthcare and health research
   a. Data Management System: ____________
   b. Quality Control Techniques: ____________
6. Assessing limitations in data collection, management, and analysis as it impacts quality; interpret findings accordingly
7. Describing the basic steps and components of data management
8. Using REDCap for basic data management procedures
9. Integrating data from multiple sources
10. Conducting basic statistical analyses on existing datasets using R
11. Designing figures to effectively communicate analytic findings
12. Using various tools to analyze and visualize data.
13. Designing analyses to address scientific questions
14. Writing technical reports with interpretation of the results
### METRICS

<table>
<thead>
<tr>
<th>Metric</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net increase in annual college enrollment UG</td>
<td>26</td>
<td>52</td>
<td>78</td>
</tr>
<tr>
<td>Net increase in college SCH UG</td>
<td>312</td>
<td>624</td>
<td>936</td>
</tr>
<tr>
<td>Net increase in annual college enrollment Grad</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net increase in college SCH Grad</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of enrollments being charged a Program Fee</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>New Sponsored Activity (MTDC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Faculty FTE (current &amp; TBH)</td>
<td>1.01</td>
<td>1.01</td>
<td>1.01</td>
</tr>
</tbody>
</table>

### FUNDING SOURCES

#### Continuing Sources

<table>
<thead>
<tr>
<th>Source</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>UG RCM Revenue (net of cost allocation)</td>
<td>40,950</td>
<td>81,900</td>
<td>122,850</td>
</tr>
<tr>
<td>Grad RCM Revenue (net of cost allocation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Fee RCM Revenue (net of cost allocation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F and A Revenues (net of cost allocations)</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>UA Online Revenues</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance Learning Revenues</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reallocation from existing College funds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Items (attach description)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Continuing</strong></td>
<td>$40,950</td>
<td>$81,900</td>
<td>$122,850</td>
</tr>
</tbody>
</table>

#### One-time Sources

<table>
<thead>
<tr>
<th>Source</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>College fund balances</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institutional Strategic Investment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gift Funding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Items (attach description)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total One-time</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL SOURCES</strong></td>
<td>$40,950</td>
<td>$81,900</td>
<td>$122,850</td>
</tr>
</tbody>
</table>

### EXPENDITURE ITEMS

#### Continuing Expenditures - additional support only

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty TBH (1 X 1.0, .51 instr/.49 research)</td>
<td>48,450</td>
<td>48,450</td>
<td>48,450</td>
</tr>
<tr>
<td>Other Personnel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee Related Expense (31.2%)</td>
<td></td>
<td>15,116</td>
<td>15,116</td>
</tr>
<tr>
<td>Graduate Assistantships sal &amp; ere (2 X .25 FTE)</td>
<td>34,584</td>
<td>34,584</td>
<td>34,584</td>
</tr>
<tr>
<td>Other Graduate Aid (tuition remission)</td>
<td>11,716</td>
<td>11,716</td>
<td>11,716</td>
</tr>
<tr>
<td>Operations (materials, supplies, phones, etc.)</td>
<td>2,500</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>Additional Space Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Items (attach description)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Continuing</strong></td>
<td>$48,800</td>
<td>$112,366</td>
<td>$112,366</td>
</tr>
</tbody>
</table>

#### One-time Expenditures

<table>
<thead>
<tr>
<th>Expenditure</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction or Renovation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start-up Equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Replace Equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library Resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Items (attach description)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total One-time</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL EXPENDITURES</strong></td>
<td>$48,800</td>
<td>$112,366</td>
<td>$112,366</td>
</tr>
</tbody>
</table>

### Net Projected Fiscal Effect

<table>
<thead>
<tr>
<th>Year</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(7,850)</td>
<td>(30,466)</td>
<td>10,484</td>
</tr>
</tbody>
</table>
Undergraduate Minor Peer Comparison Chart - delete **EXAMPLE** columns once ready to submit/upload. Find UA peers here: [https://www.azregents.edu/arizonas-public-universities/peer-institutions](https://www.azregents.edu/arizonas-public-universities/peer-institutions)

<table>
<thead>
<tr>
<th>Minor name, institution</th>
<th>Proposed UA Program: Minor in Population Health Data Science and Communication</th>
<th>Peer 1: Minor in Applied Data Science, Case Western University</th>
<th>Peer 2: Minor in Data Science, Stanford</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current# of enrolled students</td>
<td>50</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Minor program description</td>
<td>As the career opportunity as a data analyst in the health sector grows exponentially, the Population Health Data Science minor is to introduce students to the fundamentals of data science in the health sciences. The minor will be administered to be accessible both to individuals coming from the health fields to learn about data science and for those coming from data science, math, computer science, neuroscience, and other disciplines to learn to about how to address issues in public health.</td>
<td>From: <a href="https://case.edu/datascience/for-students/degree-programs/undergraduate-applied-data-science-minor">https://case.edu/datascience/for-students/degree-programs/undergraduate-applied-data-science-minor</a></td>
<td>From: <a href="https://statistics.stanford.edu/data-science-minor">https://statistics.stanford.edu/data-science-minor</a></td>
</tr>
<tr>
<td>Target careers</td>
<td>Data analyst in the health sector</td>
<td>Unspecified. However, based on the domain areas it would include any type of careers that requires data analytical skills.</td>
<td>Unspecified. Only mention that it will broaden the career opportunity</td>
</tr>
<tr>
<td>Total units required to complete the minor</td>
<td>6 courses required with 18 credits</td>
<td>5 courses required with 15 credits</td>
<td>7 courses required with at least 22 credits</td>
</tr>
<tr>
<td>Upper division units required</td>
<td>18</td>
<td>9</td>
<td>About 10</td>
</tr>
<tr>
<td>Total transfer units that may apply to minor</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
List any special requirements to declare or gain admission to this minor (completion of specific coursework, minimum GPA, interview, application, etc.)

- At the declaration of this minor, a minimum cumulative GPA of 2.5 is required.
- Course prerequisites to the program include: College Algebra (e.g. MATH 112) or a higher level MATH course.

No admissions requirement except that students have to have already declared a major.

No admissions requirement except that students have to have already declared a major.

<p>| Minor requirements (list all required coursework including core and electives). Courses listed must include course prefix, number, units, and title. Mark new coursework (New). Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department. |
|---|---|---|---|
| EPID 309: Introduction to Epidemiology (3) | Level 1: Data science programming (3) from one of the following 4 courses |
| BIOS 376: Introduction to Biostatistics (3) | ENGR 131: Elementary Computer Programming |
| EPID 450: Health Data Acquisition, Assessment and Integration (3) | EECS 132: Introduction to Programming in Java |
| BIOS 451: Health Data Management and Visualization (3) | DSCI 133: Introduction to Data Science and Engineering for Majors |
| BIOS 452: Health Data Analysis (3) | DSCI 134: Introduction to Applied Data Science |
| EPID 453: Health Data Science Practice (3) | Level 2: Inferential statistics (3) from one of the following 4 courses |
| | OPRE 207: Statistics for Business and Management Science I |
| | PQHS 431: Statistical Methods in Biological and Medical Sciences I |
| | STAT 201R: Basic Statistics for Social and Life Sciences |
| | STAT 312R: Basic Statistics for Engineering and Science |
| | Level 3: Exploratory applied data science (3) |
| | DSCI 351: Exploratory Data Science for Energy &amp; Manufacturing |
| | Level 4: Applied data science research (3) from one of the domain areas |
| | Level 5: Modeling and prognostics (3) from one of the following two courses. |
| Linear Algebra |
| Math 51: Linear Algebra and Differential Calculus of Several Variables (5) or CME 100: Vector Calculus for Engineers (5) |
| Programming |
| CS 106A: Programming Methodology (3) |
| Programming in R |
| STATS 32: Introduction to R for Undergraduates (1) or THINK 3: Breaking Codes, Finding Patterns (4) |
| Data Science |
| STATS 101: Data Science 101 Statistics |
| From one of the 6 listed 3 credit statistical courses |
| Data Mining |
| STATS 202: Data Mining and Analysis (3) |
| Data Science Methodology |
| At least one course from the 10 listed courses (2~3) |</p>
<table>
<thead>
<tr>
<th>Internship, practicum, applied course requirements (yes/no). If yes, provide description.</th>
<th>None</th>
<th>None</th>
<th>None</th>
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<tbody>
<tr>
<td>Additional requirements (provide description)</td>
<td>None</td>
<td>None</td>
<td>None</td>
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</tbody>
</table>

*Note: comparison of additional relevant programs may be requested.*
April 24, 2019

Zhao Chen, PhD, MPH
Professor and Chair, Dept of Epidemiology and Biostatistics
Mel and Eni Zuckerman College of Public Health (COPH)

RE: Population Health Data Science minor (COPH)

Dear Zhao,

The Eller College of Management supports the creation of this undergraduate minor. This minor will offer opportunities for our students to acquire knowledge in this emerging area of the job market.

Sincerely,

Paulo B. Goes
Dean and Halle Chair in Leadership
Eller College of Management
University of Arizona
April 26, 2019

Kacey Ernst, PhD, MPH
Associate Professor and Program Director
Epidemiology Undergraduate and Graduate Programs

Chiu-Hsieh (Paul) Hsu
Professor
Biostatistics Program

Re: Letter of Support for Population Health Data Science minor

Dear Professors Ernst and Hsu,

The Department of Mathematics has reviewed the proposal put forth by the Mel and Enid Zucker-
man College of Public Health to implement the new undergraduate minor, Population Health Data
Science. We are writing to offer our strong backing for this new student opportunity.

Transformations in the nature and size of data in the health field necessitate the development of
new skillsets for the workforce to assess, analyze and interpret these data. Spurred in large part
by the acceleration of electronic health records, one aspect of this revolution in health data is
known as health informatics, i.e., the acquiring, storing, retrieving, and using of massive amounts of
healthcare information and communicating its meaning to both medical professionals and the public
at large. As amply described in your proposal, job prospects are rapidly increasing in this sector.
Consequently, this timely proposal meets a critical statewide and national need. Moreover, this work
falls in line with the current University strategic plans and initiatives including the newly instituted
undergraduate degree in Statistics and Data Science offered by the Department of Mathematics.
Their program is rapidly expanding with over 50 majors enrolled in its first two months. The
Population Health Data Science minor will be a very attractive complement for the students in
this major and for other majors in the College of Science including the Probability/Statistics and
Applied tracks of the Mathematics major.

Best wishes as you complete the approval process.

Sincerely,

Douglas Ulmer
Professor and Head
March 4, 2019

Letter of Support for Population Health Data Science

Kacey Ernst, PhD, MPH
Associate Professor and Program Director
Epidemiology Undergraduate and Graduate Programs

Chiu-Hsieh (Paul) Hsu
Professor
Biostatistics Program

Dear Professors Ernst and Hsu,

The Executive Committee for the Graduate Interdisciplinary Program in Statistics has reviewed the proposal put forth by the Mel and Enid Zuckerman College of Public Health to implement the new undergraduate minor, Population Health Data Science. We are writing to offer our strong backing for this new student opportunity.

Statistics, in general, and biostatistics, in particular, has undergone a dramatic change in the past decade. The major source of this change arises from the transformation in the nature and size of data. Spurred in large part by the acceleration of electronic health records, one aspect of this revolution in biostatistical data is the known as health informatics, i.e., the acquiring, storing, retrieving, and using of massive amounts of healthcare information and communicating its meaning to both medical professionals and the public at large. As amply described in your proposal, job prospects are rapidly increasing. Consequently, this timely proposal meets a critical statewide and national need. Moreover, the University instituted in the fall of 2118, a new undergraduate degree in Statistics and Data Science. The program is rapidly expanding with over 50 majors enrolled in its first 2 months. The Population Health Data Science minor will be a very attractive complement for these Statistics students.

Best wishes as you complete the approval process.

Respectfully yours,

Joseph C. Watkins
Chair, Graduate Program in Statistics
May 15, 2019

Kacey Ernst, PhD, MPH
Associate Professor and Program Director
Epidemiology Undergraduate and Graduate Programs

Chiu-Hsieh (Paul) Hsu
Professor
Biostatistics Program

Dear Professors Ernst and Hsu,

The College of Science has discussed the proposal put forth by the Mel and Enid Zuckerman College of Public Health to implement a new undergraduate minor in Population Health Data Science. We enthusiastically support this program and the new opportunities it offers to UA students.

This timely proposal meets a critical statewide and national need for individuals with skillsets in data science. In addition, this work aligns with the current University strategic plans and initiatives in data science. The Population Health Data Science minor will be an attractive complement for the students in many of our majors including Bioinformatics, Neuroscience and Cognitive Science, and Data Science and Statistics. We look forward to working across our colleges to ensure the success of this minor.

Please feel free to contact me with regards to this program, and I wish you well as you complete the approval process.

Best regards,

Elliott Cheu, Ph.D.
Associate Dean, College of Science
Distinguished Professor of Physics
The University of Arizona
May 3, 2019

Kacey Ernst, PhD, MPH
Associate Professor and Program Director
Epidemiology Undergraduate and Graduate Programs

Chiu-Hsieh (Paul) Hsu
Professor
Biostatistics Program

Dear Professors Ernst and Hsu,

This is a letter of support for the proposed undergrad minor called "Applied Population Health Data Science" in your unit. I believe this will be a great minor to augment our own undergraduate degrees, but also those in disciplines like Geography or Sociology.

There is no conflict with School of Information programs and there are certainly opportunities here for synergy. We are eager to welcome your students into our classes if that is ever needed. We have a nice intro – level/no prereqs needed for ISTA 321, Data Mining. For example.

We look forward to future collaboration.

Sincerely,

Catherine Brooks, Director
School of Information
Q2 - What is your major?

- Not at all interested
- Slightly interested
- Moderately interested
- Very Interested
<table>
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<tr>
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<th>Field</th>
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<th>Moderately interested</th>
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<td>6.90% 2</td>
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<tr>
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<td>0.00% 0</td>
<td>0.00% 0</td>
</tr>
<tr>
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<td>Other: (please specify)</td>
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<td>28.13% 9</td>
<td>20.00% 13</td>
<td>15.63% 5</td>
<td>20.69% 6</td>
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</tbody>
</table>

Showing rows 1 - 11 of 11

Q2.10_TEXT - Other: (please specify)

Not at all interested

Other: (please specify)

Slightly interested

Other: (please specify)

test

Industrial Engineering

Engineering

Double major: Public Health and Psychology
### Other: (please specify)
- Care, Health, and Society
- Biomedical sciences
- Biology
- Biology
- Biology
- Biology
- Moderately interested
- Other: (please specify)
- Neuroscience & Cognitive Science
- Molecular and Cellular Biology
- Industrial Engineering
- Hydrology
- Biology
- Biology
- Biology
- Biology
- Bio
- Anthropology
- Anthropology
- Anthropology
- Anthropology
- anthro
- Very Interested
- Other: (please specify)
- Systems Engineering
- Pre-business
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<th>Field</th>
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<td>Care Health and Society</td>
</tr>
<tr>
<td>Biology</td>
</tr>
<tr>
<td>Extremely interested</td>
</tr>
<tr>
<td>Other: (please specify)</td>
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<tr>
<td>Psychology</td>
</tr>
<tr>
<td>Psychology</td>
</tr>
<tr>
<td>Neuroscience and Cognitive Science, Computer Science</td>
</tr>
<tr>
<td>Neuroscience</td>
</tr>
<tr>
<td>Natural Resources</td>
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<tr>
<td>Ecology and evolutionary biology</td>
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Q3 - Do you plan to take a minor?

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<th>Moderately interested</th>
<th>Very Interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
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<tbody>
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<td>Yes, required by my major.</td>
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<td>21.43%</td>
<td>28.57%</td>
<td>21.43%</td>
<td>21.43%</td>
<td>14</td>
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<tr>
<td>2</td>
<td>Yes, but it is not required</td>
<td>4.94%</td>
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<tr>
<td>3</td>
<td>No</td>
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<td>16.28%</td>
<td>41.86%</td>
<td>13.95%</td>
<td>13.95%</td>
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<td>Unsure</td>
<td>0.00%</td>
<td>12.90%</td>
<td>54.84%</td>
<td>16.13%</td>
<td>16.13%</td>
<td>31</td>
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</table>

Showing rows 1 - 4 of 4
Q4 - The overall objectives of the proposed minor are: Be able to talk to a data scientist to develop collaborations in health research. Obtain some basic data analysis skills. Introduce concepts related to data science and opportunities for further training at a graduate level in the health sciences. Communicate results effectively to community and decision-makers.

What is your level of interest in a minor that would pursue these objectives?

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<th>Field</th>
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<tr>
<td>2</td>
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<td>4</td>
<td>Very Interested</td>
<td>18.93% 32</td>
</tr>
<tr>
<td>5</td>
<td>Extremely interested</td>
<td>17.16% 29</td>
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</tbody>
</table>

Showing rows 1 - 6 of 6
Q5 - Rank your level of interest in acquiring the following skills.

- Understand the role of data science in public health
- Get familiar with key sources of public health data
- Evaluate indicators of data quality
- Create and manage databases
- Merge data from various sources
- Conduct basic analyses on large datasets
- Understand key concepts in data mining
- Interpret data appropriately in light of limitations
- Communicate analytic findings in oral and written format
- Visualize data graphically
Understand the role of data science in public health
Get familiar with key sources of public health data
Evaluate indicators of data quality
Create and manage databases
Merge data from various sources
Conduct basic analyses on large datasets
Understand key concepts in data mining
Interpret data appropriately in light of limitations
Communicate analytic findings in oral and written format
Visualize data graphically
Understand the role of data science in public health
Get familiar with key sources of public health data
Evaluate indicators of data quality
Create and manage databases
Merge data from various sources
Conduct basic analyses on large datasets
Understand key concepts in data mining
Understand the role of data science in public health
Get familiar with key sources of public health data
Evaluate indicators of data quality
Create and manage databases
Merge data from various sources
Conduct basic analyses on large datasets
Understand key concepts in data mining
Interpret data appropriately in light of limitations
Communicate analytic findings in oral and written format
Visualize data graphically
Understand the role of data science in public health
Get familiar with key sources of public health data
Evaluate indicators of data quality
Create and manage databases
Merge data from various sources
Conduct basic analyses on large datasets
Understand key concepts in data mining
Interpret data appropriately in light of limitations
Communicate analytic findings in oral and written format
Visualize data graphically

<table>
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<tr>
<th>Field</th>
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<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very interested</th>
<th>Extremely interested</th>
<th>Total</th>
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<td>10.00% 1</td>
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<td>Moderately interested</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Get familiar with key sources of public health data</td>
<td>40.00%</td>
<td>20.00%</td>
<td>40.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>3</td>
<td>Evaluate indicators of data quality</td>
<td>70.00%</td>
<td>0.00%</td>
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<td>10.00%</td>
<td>0.00%</td>
</tr>
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<tr>
<td>5</td>
<td>Merge data from various sources</td>
<td>80.00%</td>
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<td>0.00%</td>
</tr>
<tr>
<td>6</td>
<td>Conduct basic analyses on large datasets</td>
<td>70.00%</td>
<td>0.00%</td>
<td>20.00%</td>
<td>10.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>7</td>
<td>Understand key concepts in data mining</td>
<td>60.00%</td>
<td>20.00%</td>
<td>20.00%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>8</td>
<td>Interpret data appropriately in light of limitations</td>
<td>70.00%</td>
<td>10.00%</td>
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<td>0.00%</td>
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<tr>
<td>9</td>
<td>Communicate analytic findings in oral and written format</td>
<td>60.00%</td>
<td>20.00%</td>
<td>10.00%</td>
<td>0.00%</td>
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<tr>
<td>10</td>
<td>Visualize data graphically</td>
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Showing rows 1 - 10 of 10

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<tr>
<td>2</td>
<td>Get familiar with key sources of public health data</td>
<td>3.70%</td>
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<td>11.11%</td>
<td>11.11%</td>
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<td>Evaluate indicators of data quality</td>
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<td>7.41%</td>
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<td>7.41%</td>
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<td>Communicate analytic findings in oral and written format</td>
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<td>Get familiar with key sources of public health data</td>
<td>2.04%</td>
<td>14.29%</td>
<td>44.90%</td>
<td>22.53%</td>
<td>12.24%</td>
<td>49</td>
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<td>Evaluate indicators of data quality</td>
<td>0.00%</td>
<td>32.65%</td>
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<td>Conduct basic analyses on large datasets</td>
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<td>Communicate analytic findings in oral and written format</td>
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<td>18.37%</td>
<td>30.61%</td>
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<td>Visualize data graphically</td>
<td>0.00%</td>
<td>10.20%</td>
<td>34.69%</td>
<td>22.45%</td>
<td>32.65%</td>
<td>49</td>
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</tbody>
</table>

### Showing rows 1 - 10 of 10

<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
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<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Understand the role of data science in public health</td>
<td>3.57%</td>
<td>0.00%</td>
<td>25.00%</td>
<td>53.57%</td>
<td>17.86%</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>Get familiar with key sources of public health data</td>
<td>0.00%</td>
<td>3.57%</td>
<td>17.86%</td>
<td>53.57%</td>
<td>25.00%</td>
<td>28</td>
</tr>
<tr>
<td>3</td>
<td>Evaluate indicators of data quality</td>
<td>3.57%</td>
<td>3.57%</td>
<td>28.57%</td>
<td>46.43%</td>
<td>17.86%</td>
<td>28</td>
</tr>
<tr>
<td>4</td>
<td>Create and manage databases</td>
<td>0.00%</td>
<td>14.29%</td>
<td>28.57%</td>
<td>35.71%</td>
<td>21.43%</td>
<td>28</td>
</tr>
<tr>
<td>5</td>
<td>Merge data from various sources</td>
<td>3.57%</td>
<td>7.14%</td>
<td>25.00%</td>
<td>46.43%</td>
<td>17.86%</td>
<td>28</td>
</tr>
<tr>
<td>6</td>
<td>Conduct basic analyses on large datasets</td>
<td>3.57%</td>
<td>7.14%</td>
<td>10.71%</td>
<td>60.71%</td>
<td>17.86%</td>
<td>28</td>
</tr>
<tr>
<td>7</td>
<td>Understand key concepts in data mining</td>
<td>3.57%</td>
<td>3.57%</td>
<td>28.57%</td>
<td>46.43%</td>
<td>17.86%</td>
<td>28</td>
</tr>
<tr>
<td>8</td>
<td>Interpret data appropriately in light of limitations</td>
<td>3.57%</td>
<td>3.57%</td>
<td>10.71%</td>
<td>46.43%</td>
<td>35.71%</td>
<td>28</td>
</tr>
<tr>
<td>9</td>
<td>Communicate analytic findings in oral and written format</td>
<td>0.00%</td>
<td>7.14%</td>
<td>17.86%</td>
<td>39.29%</td>
<td>35.71%</td>
<td>28</td>
</tr>
<tr>
<td>10</td>
<td>Visualize data graphically</td>
<td>0.00%</td>
<td>3.57%</td>
<td>3.57%</td>
<td>42.86%</td>
<td>50.00%</td>
<td>28</td>
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</tbody>
</table>

### Showing rows 1 - 10 of 10
<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Not at all interested</th>
<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Understand the role of data science in public health</td>
<td>4.00% 1</td>
<td>0.00% 0</td>
<td>4.00% 1</td>
<td>40.00% 10</td>
<td>52.00% 13</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>Get familiar with key sources of public health data</td>
<td>4.00% 1</td>
<td>0.00% 0</td>
<td>4.00% 1</td>
<td>32.00% 8</td>
<td>60.00% 15</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>Evaluate indicators of data quality</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>8.00% 2</td>
<td>32.00% 8</td>
<td>60.00% 15</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>Create and manage databases</td>
<td>4.00% 1</td>
<td>0.00% 0</td>
<td>8.00% 2</td>
<td>24.00% 6</td>
<td>64.00% 16</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>Merge data from various sources</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>8.00% 2</td>
<td>24.00% 6</td>
<td>68.00% 17</td>
<td>25</td>
</tr>
<tr>
<td>6</td>
<td>Conduct basic analyses on large datasets</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>24.00% 6</td>
<td>76.00% 19</td>
<td>25</td>
</tr>
<tr>
<td>7</td>
<td>Understand key concepts in data mining</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>4.00% 1</td>
<td>16.00% 4</td>
<td>80.00% 20</td>
<td>25</td>
</tr>
<tr>
<td>8</td>
<td>Interpret data appropriately in light of limitations</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>4.00% 1</td>
<td>16.00% 4</td>
<td>80.00% 20</td>
<td>25</td>
</tr>
<tr>
<td>9</td>
<td>Communicate analytic findings in oral and written format</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>20.00% 5</td>
<td>80.00% 20</td>
<td>25</td>
</tr>
<tr>
<td>10</td>
<td>Visualize data graphically</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>24.00% 6</td>
<td>76.00% 19</td>
<td>25</td>
</tr>
</tbody>
</table>

Showing rows 1 - 10 of 10
Q6 - We are considering offering the minor classes in a series of four 7.5 week sessions. This will allow students to build skills in succession and ensure continuity of the learning objectives. How appealing is this format to you?

<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Not at all interested</th>
<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very Interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not at all appealing</td>
<td>50.00%</td>
<td>25.00%</td>
<td>1</td>
<td>0.00%</td>
<td>25.00%</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Not appealing</td>
<td>12.50%</td>
<td>37.50%</td>
<td>3</td>
<td>37.50%</td>
<td>0</td>
<td>12.50%</td>
</tr>
<tr>
<td>3</td>
<td>Somewhat appealing</td>
<td>8.33%</td>
<td>25.00%</td>
<td>12</td>
<td>37.50%</td>
<td>18</td>
<td>14.58%</td>
</tr>
<tr>
<td>4</td>
<td>Appealing</td>
<td>6.25%</td>
<td>16.67%</td>
<td>8</td>
<td>45.83%</td>
<td>22</td>
<td>20.83%</td>
</tr>
<tr>
<td>5</td>
<td>Extremely appealing</td>
<td>0.00%</td>
<td>10.34%</td>
<td>3</td>
<td>17.24%</td>
<td>5</td>
<td>27.59%</td>
</tr>
</tbody>
</table>

Showing rows 1 - 5 of 5
Q7 - What is your preferred mode of learning?

<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Not at all interested</th>
<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very Interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Online</td>
<td>5.56%</td>
<td>25.00%</td>
<td>25.00%</td>
<td>33.33%</td>
<td>11.11%</td>
<td>36</td>
</tr>
<tr>
<td>2</td>
<td>In-person</td>
<td>11.48%</td>
<td>21.31%</td>
<td>37.70%</td>
<td>13.11%</td>
<td>16.39%</td>
<td>61</td>
</tr>
<tr>
<td>3</td>
<td>Hybrid</td>
<td>2.50%</td>
<td>12.50%</td>
<td>40.00%</td>
<td>17.50%</td>
<td>27.50%</td>
<td>40</td>
</tr>
</tbody>
</table>

Showing rows 1 - 3 of 3
Q8 - If you don’t already have coding skills, would you be willing to take an introduction to computer coding course prior to entry into the minor?

<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Not at all interested</th>
<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very Interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>2.50% 2</td>
<td>17.50% 14</td>
<td>41.25% 33</td>
<td>20.00% 16</td>
<td>18.75% 15</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>26.32% 5</td>
<td>15.79% 3</td>
<td>26.32% 5</td>
<td>21.05% 4</td>
<td>10.53% 2</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>Unsure</td>
<td>8.00% 2</td>
<td>28.00% 7</td>
<td>24.00% 6</td>
<td>20.00% 5</td>
<td>20.00% 5</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>N/A, I already have coding skills.</td>
<td>7.69% 1</td>
<td>23.08% 3</td>
<td>30.77% 4</td>
<td>15.38% 2</td>
<td>23.08% 3</td>
<td>13</td>
</tr>
</tbody>
</table>

Showing rows 1 - 4 of 4
Q10 - With which race/ethnicity do you identify?
<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Not at all interested</th>
<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very Interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>African American or Black</td>
<td>0.00%</td>
<td>16.67%</td>
<td>50.00%</td>
<td>0.00%</td>
<td>33.33%</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>American Indian or Alaska Native</td>
<td>20.00%</td>
<td>0.00%</td>
<td>20.00%</td>
<td>40.00%</td>
<td>20.00%</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Asian American or Asian</td>
<td>17.65%</td>
<td>17.65%</td>
<td>17.65%</td>
<td>35.29%</td>
<td>11.76%</td>
<td>17</td>
</tr>
<tr>
<td>4</td>
<td>Hispanic or Latino</td>
<td>2.50%</td>
<td>22.50%</td>
<td>37.50%</td>
<td>15.00%</td>
<td>22.50%</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>Middle Eastern</td>
<td>0.00%</td>
<td>20.00%</td>
<td>40.00%</td>
<td>20.00%</td>
<td>20.00%</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Multiracial</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100.00%</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>Pacific Islander</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>White or Caucasian</td>
<td>6.41%</td>
<td>17.95%</td>
<td>32.05%</td>
<td>23.08%</td>
<td>20.51%</td>
<td>78</td>
</tr>
<tr>
<td>9</td>
<td>An identity not listed, self-identify</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>3</td>
</tr>
</tbody>
</table>

Showing rows 1 - 9 of 9

An identity not listed, self-identify:

Not at all interested

An identity not listed, self-identify:

Slightly interested

An identity not listed, self-identify:

Moderately interested

An identity not listed, self-identify:

Mexican

n/a

Mexican-American

Very Interested

An identity not listed, self-identify:

Extremely interested
An identity not listed, self-identify:
Q11 - With which gender do you identify?

<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Not at all interested</th>
<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very Interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Woman</td>
<td>8.74% 9</td>
<td>20.39% 21</td>
<td>33.98% 35</td>
<td>19.42% 20</td>
<td>17.48% 18</td>
<td>103</td>
</tr>
<tr>
<td>2</td>
<td>Man</td>
<td>0.00% 0</td>
<td>16.67% 5</td>
<td>40.00% 12</td>
<td>23.33% 7</td>
<td>20.00% 6</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>Transgender</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Non-binary</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Genderqueer or gender nonconforming</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>0</td>
</tr>
<tr>
<td>#</td>
<td>Field</td>
<td>Not at all interested</td>
<td>Slightly interested</td>
<td>Moderately interested</td>
<td>Very Interested</td>
<td>Extremely interested</td>
<td>Total</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------</td>
<td>-----------------------</td>
<td>---------------------</td>
<td>-----------------------</td>
<td>-----------------</td>
<td>---------------------</td>
<td>-------</td>
</tr>
<tr>
<td>6</td>
<td>An identity not listed, self-identify:</td>
<td>50.00%</td>
<td>0.00%</td>
<td>50.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>2</td>
</tr>
</tbody>
</table>

An identity not listed, self-identify:

Not at all interested

An identity not listed, self-identify:

Shishaboban

Slightly interested

An identity not listed, self-identify:

Moderately interested

An identity not listed, self-identify:

n/a

Very Interested

An identity not listed, self-identify:

Extremely interested

An identity not listed, self-identify:

Showing rows 1 - 6 of 6
Q12 - Do you identify as someone with a disability or impairment?

<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Not at all interested</th>
<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very Interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>12.50%</td>
<td>12.50%</td>
<td>50.00%</td>
<td>12.50%</td>
<td>12.50%</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>7.14%</td>
<td>19.84%</td>
<td>34.13%</td>
<td>20.63%</td>
<td>18.25%</td>
<td>126</td>
</tr>
</tbody>
</table>

Showing rows 1 - 2 of 2
Q13 - Have either of your parent(s) or guardians earned a bachelor's degree or higher?

<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Not at all interested</th>
<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very Interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>7.61% 7</td>
<td>17.39% 16</td>
<td>38.04% 35</td>
<td>16.30% 15</td>
<td>20.65% 19</td>
<td>92</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>7.32% 3</td>
<td>24.39% 10</td>
<td>29.27% 12</td>
<td>29.27% 12</td>
<td>9.76% 4</td>
<td>41</td>
</tr>
</tbody>
</table>

Showing rows 1 - 2 of 2
Q14 - Do you identify as an active member or veteran of the U.S. Armed Forces, Reserves, or National Guard?

<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Not at all interested</th>
<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very Interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No</td>
<td>7.69%</td>
<td>19.23%</td>
<td>35.38%</td>
<td>20.00%</td>
<td>17.69%</td>
<td>130</td>
</tr>
<tr>
<td>2</td>
<td>Yes, veteran</td>
<td>0.00%</td>
<td>33.33%</td>
<td>33.33%</td>
<td>33.33%</td>
<td>0.00%</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Yes, active duty</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0</td>
</tr>
</tbody>
</table>

Showing rows 1 - 3 of 3
Q16 - Did you receive a Federal Pell Grant as part of your financial aid package?

<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Not at all interested</th>
<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very Interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>1.96%</td>
<td>19.61%</td>
<td>39.22%</td>
<td>17.65%</td>
<td>21.57%</td>
<td>51</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>11.39%</td>
<td>17.72%</td>
<td>31.65%</td>
<td>22.78%</td>
<td>16.46%</td>
<td>79</td>
</tr>
</tbody>
</table>

Showing rows 1 - 2 of 2
Q15 - Please provide any other comments about this potential minor that you feel would be important for the development committee.

Not at all interested

Please provide any other comments about this potential minor that you feel...

unsure

no

Do not have comments at this time.

I think adding more classes and choices is always a great thing! This topic is just not that appealing to me however, it could be extremely beneficial to other students looking to pursue a career in bio statistics, research, or data collecting.

not interested

Slightly interested

Please provide any other comments about this potential minor that you feel...

I think this would be an interesting course, but mainly if it was held in person.

no comments

I think this is an important aspect of public health and the idea of potentially offering this as a minor would be beneficial.

I am about to graduate so this opportunity was a little irrelevant to me. However, I like the initiative, and I am sure a lot of students would take advantage of it!

In today’s world, it seems that lots of data CAN be collected, regardless of whether it SHOULD be collected. Any one interested in this field should learn about the laws and privacy limitations that limit what can and cannot be collected as well.

NA

test

Moderately interested

Please provide any other comments about this potential minor that you feel...

N/A

The minor sounds very interesting and advantageous to students pursuing any form of healthcare career. I would personally be interested to see what the curriculum entailed and further weigh the possible benefits of pursuing this as a minor. I also appreciate the questions asked in the survey, as I believe they were both informative and will produce valuable input.

None
<table>
<thead>
<tr>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would love an opportunity to take classes online or over the summer so I don't have to get behind in my major.</td>
</tr>
<tr>
<td>The university should absolutely be offering data analytics/ science as a minor. Data science is going to be one of the biggest fields in the workforce in the future! Please reduce funding for all liberal arts majors, and increase funding for data science teaching.</td>
</tr>
<tr>
<td>This survey does not tell much about the class but if this is a class that help students to analyze and present data using public health data as an example that is something I'm interested in. If this is a public health class that teaches some version of data analysis that is less appealing to me.</td>
</tr>
<tr>
<td>n/a</td>
</tr>
<tr>
<td>I can't take it since I'm graduating, but it seems like a really good idea.</td>
</tr>
<tr>
<td>Very Interested</td>
</tr>
<tr>
<td>Please provide any other comments about this potential minor that you feel...</td>
</tr>
<tr>
<td>I wish this minor had existed earlier!</td>
</tr>
<tr>
<td>N/A</td>
</tr>
<tr>
<td>If in hybrid format, do meetings with data scientist in person and course material online.</td>
</tr>
<tr>
<td>I think this is a wonderful idea. My suggestion is to add summer online classes for the minor. I know that some public health majors already feel stress when it comes to the curriculum, internship, and other minors as well, so adding summer classes would give us the opportunity to pursue this minor as well!</td>
</tr>
<tr>
<td>I agree continuity is important, 2 7.5 week courses is a hefty load for students and may cause them to complete mediocre work.</td>
</tr>
<tr>
<td>Extremely interested</td>
</tr>
<tr>
<td>Please provide any other comments about this potential minor that you feel...</td>
</tr>
<tr>
<td>Cost of the Minor/the week programming. Times the courses are offered for the minor. Whether the courses can be &quot;double-dipped&quot; with other Public Health major courses.</td>
</tr>
<tr>
<td>Would love this but graduate next fall!</td>
</tr>
<tr>
<td>This minor sounds like a great idea, my only regret is that I'll have graduate by the time it is an option.</td>
</tr>
<tr>
<td>n/a</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>The approach to contribute in a positive way to the world is by the opportunity of learning, creating and sharing with people the importance and understanding of health worldwide.</td>
</tr>
<tr>
<td>This sounds like a fun minor that I need to graduate. Make it fast so I can start taking classes.</td>
</tr>
<tr>
<td>THIS IS SUCH A NECESSARY MINOR FOR PUBLIC HEALTH STUDENTS TO GAIN TECHNICAL SKILLS, SERIOUSLY.</td>
</tr>
</tbody>
</table>
Please provide any other comments about this potential minor that you feel...

I am graduating but I would have 100000% done this minor. Looking for jobs now I really think this would have been an amazing asset to my learning here.

This would be excellent as a minor, and would be even better to see Public Health Data Science offered as a track/focus within the Public Health major.

Statistical coding skills should be taught. Especially in SAS.
### Q10_9_TEXT - Topics

<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Not at all interested</th>
<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very Interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unknown</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>100.00% 3</td>
<td>0.00% 0</td>
<td>0.00% 0</td>
<td>3</td>
</tr>
</tbody>
</table>

Showing rows 1 - 1 of 1
Q15 - Topics

Not at all interested
Slightly interested
Moderately interested
Very Interested
Extremely interested

<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Not at all interested</th>
<th>Slightly interested</th>
<th>Moderately interested</th>
<th>Very Interested</th>
<th>Extremely interested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unknown</td>
<td>100.00% 5</td>
<td>100.00% 7</td>
<td>100.00% 8</td>
<td>100.00% 5</td>
<td>100.00% 12</td>
<td>37</td>
</tr>
</tbody>
</table>

Showing rows 1 - 1 of 1

End of Report
CURRICULUM VITAE

ZHAO CHEN, PhD, MPH

March 2018

Department of Epidemiology and Biostatistics
Mel & Enid Zuckerman College of Public Health
University of Arizona
1295 N Martin
Tucson, AZ 85724-5211
P.O. Box 245211
Phone: (520) 626-9011
Fax: (520) 626-9900
E-mail: zchen@u.arizona.edu

CHRONOLOGY OF EDUCATION

1983  Beijing Normal University, Beijing China, B.S., (Biology)

1985  Graduate School, Academic Sinica, Beijing China, M.S., (Physical Anthropology)
      Thesis Director: Prof. Rukang Wu
      Thesis Title: The growth of 2-6 years old kindergartner in Beijing.

1995  University of Arizona, Tucson, M.P.H., (Public Health Nutrition)
      Internship Director: Dr. Douglas Taren
      Report Title: Needs Assessment for Senior Citizens in the Flowing Wells Neighborhood, Tucson

1996  University of Arizona, Tucson, Ph.D., (Physical Anthropology)
      Dissertation Director: Dr. William A. Stini
      Dissertation Title: The Relationship between Bone Mass, Body Composition, Nutrient Intake, and Physical Activity Level in Healthy Postmenopausal Women

1996-1997 University of Arizona, Tucson, Postdoctoral Training (Epidemiology)

CONTINUING EDUCATION

1998  The New England Epidemiology Institute Summer Program at Tufts Univ.
      Courses: The Biology and Epidemiology of Cancer
             Epidemiologic Data Analysis; Logistic Regression Modeling
             Novel Epidemiologic Designs for Sudden-Onset Events

1999  The 17th Annual Graduate Summer Institute of Epidemiology & Biostatistics at Johns Hopkins School of Hygiene & Public Health
      Courses: Outcomes and Effectiveness Research
Regression Analysis in Public Health Research

2000  The 18th Annual Graduate Summer Institute of Epidemiology & Biostatistics at Johns Hopkins School of Hygiene & Public Health  
Course: Survival Analysis

2001  The 19th Annual Graduate Summer Institute of Epidemiology & Biostatistics at Johns Hopkins School of Hygiene & Public Health  
Courses: Data Analysis Workshop  
Molecular Biology; Genetic Epidemiology

CHRONOLOGY OF EMPLOYMENT

1985 - 1987  Research Associate, Section of Physical Anthropology, IVPP, Academic Sinica, Beijing China

1988 - 1990  Graduate Teaching and Research Assistant, Department of Anthropology, University of Arizona, Tucson

1991 - 1996  Graduate Research Associate, Department of Anthropology, University of Arizona, Tucson

1996 - 1997  Research Associate, Section of Epidemiology, Arizona Prevention Center, College of Medicine, University of Arizona, Tucson

1996 - 2001  Member, Section of Osteoporosis, Arizona Arthritis Center, College of Medicine, University of Arizona, Tucson.

1997 - 1999  Research Assistant Professor, Section of Epidemiology, Arizona Prevention Center, College of Medicine, University of Arizona, Tucson.

1998 - Now  Member, Cancer Prevention and Control, Arizona Cancer Center.

2000 -2003  Faculty, Interdisciplinary Degree Program, Epidemiology, University of Arizona.

2000 -2004  Assistant Professor of Public Health, Division of Epidemiology and Biostatistics, Mel and Enid Zuckerman Arizona College of Public Health, University of Arizona.

2002 - 2007  Core faculty, Arizona Geriatric Education Center, Arizona Center on Aging, University of Arizona.


2004- 2009  Associate Professor of Public Health, Division of Epidemiology and Biostatistics, Mel and Enid Zuckerman College of Public Health, University of Arizona (tenured in 2005).
2006-2007 Chair, Graduate Program of Public Health, Mel and Enid Zuckerman College of Public Health, University of Arizona.

2006- Now Faculty member of the Statistics Graduate Interdisciplinary Program, University of Arizona.

2006- Now Member, Arizona Arthritis Center, University of Arizona

2006- Now Affiliate Faculty, Center for Physical Activity and Nutrition, University of Arizona

2008- Now Member, Southwest Environmental Health Sciences Center, College of Pharmacy, University of Arizona

2008- Now Director, Division of Epidemiology and Biostatistics. Mel and Enid Zuckerman College of Public Health, University of Arizona

2009-Now Professor of Public Health, Division of Epidemiology and Biostatistics, Mel and Enid Zuckerman College of Public Health, University of Arizona

2009-Now Affiliated professor, School of Anthropology, University of Arizona

2011-Now Director for UA Clinical and Translational Research Graduate Certificate Program

2011-2016 Co-director, Confucius Institute at the University of Arizona

2017—Now Director, Confucius Institute at the University of Arizona

HONORS & AWARDS
1990 Graduate Academic Award, University of Arizona
1991 Graduate Academic Award, University of Arizona
1992 Graduate Academic Award, University of Arizona
1996-1997 Osteoporosis Fellowship, Arizona Arthritis Center, University of Arizona
1997-2003 Career Development Award, National Institution of Health
2001-2003 Junior Faculty Awards for participating in the annual meeting of gender-based research by the Society for Women’s Health Research
2006 - Now Member of the Alpha Nu Chapter of Delta Omega
The National Public Health Honorary Society
2010 Alumnus of the Year, Mel and Enid Zuckerman College of Public Health, University of Arizona
2011 Excellence in Research Award, Mel and Enid Zuckerman College of Public Health
2012 Outstanding Faculty Award, the University of Arizona Asian American Faculty, Staff and Alumni Association.
SERVICE/OUTREACH

- **Local/State**
  - 1999 - 2001 Member, Arizona Osteoporosis Coalition Steering Comm.
  - 1999 - 2001 Chair, Finance Committee of the Arizona Osteoporosis Coalition
  - 1999 - 2001 Member, Data Committee of the Arizona Osteoporosis Coalition
  - 2000 - 2001 Member, Grant Review Committee for the Bureau of Community and Family Health Services Office of Prevention and Health Promotion, Arizona Department of Health Services
  - 1999 - 2003 Public Education (see presentations)
  - 2001 - 2002 Member of the Arizona Osteoporosis Coalition Board
  - 2003 - 2004 Reviewer, Public Health Section of the Arizona Geriatrics Society Journal
  - 2007 - 2011 State Falls Prevention Sub-Committee (FPSC) Of the Social, Health & Alzheimer’s Committee Governor's Advisory Council on Aging, Arizona
  - 2008 Member for the Arizona State Public Health System Assessment for the National Public Health Performance Standards Program
  - 2008 Community outreach: Presentation on Taichi and Bone Health, Quail Greek, Green Valley, Arizona
  - 2008 Community outreach: Health Fair, Quail Greek, Green Valley, Arizona
  (provide body composition assessment and bone health information)
  - 2008 Community outreach: Presentation on Bone and Breast Health, organized by Tucson Sino Choir
  - 2008 Community outreach: Presentation on Healthy Bones, organized by Tucson Chinese Culture Center
  - 2008-2009 Community Profile Committee for the South Arizona Affiliate, Susan G. Komen for the Cure
  - 2009 AHEC initiative workgroup: focus on Health Promotion and Disease Prevention Needs and Assets initiative in the Yuma region
  - 2009 Community outreach: Presentation on BMI and Health, Quail Greek, Green Valley, Arizona
  - 2009 Community outreach: Health Fair, Quail Greek, Green Valley, Arizona
  (Providing body composition assessment and bone health information)
  - 2011 Scientific member for the community profile by the Susan G. Komen Southern Arizona Chapter.

- **National/International**
  - 1998 - 2001 Consultant for magazine “U. S. Healthy Life”.
  - 1999 - 2005 Member, the Calcium/Vitamin D Osteoporosis Advisory Committee of The Women's Health Initiative.
  - 2000 - 2003 Reviewer, Cancer Epidemiology, Biomarkers & Prevention.
2001 - 2004  Member, the Special Population Advisory Committee of the Women’s Health Initiative.
2001 - 2003  Member, the Aging Working Group, Women’s Health Initiative.
2003 -2004  Reviewer, Asian Journal of Andrology
2004  Reviewer, European Journal of Clinical Nutrition
2004  Member, NIH special emphasis panel for mentored patient-oriented research career development, National Institute of Arthritis, Musculoskeletal and Skin Diseases
2004  Member, Susan G. Komen Breast Cancer Foundation Postdoctoral Fellowship Study Section.
2004  Reviewer, Journal of National Institute of Cancer
2004  Book Reviewer, Epidemiology of Aging (Jones and Bartlett Publishers, 40 Tall Pine Dr., Sudbury, MA 01776)
2005  Reviewer, Cancer Epidemiology, Biomarkers & Prevention
2005  Member, National Institute of Aging Review Group for the Reverse Site Visit of the ISALES P01 (July 7 & 8)
2005  Member, National Institute of Arthritis and Musculoskeletal and Skin Diseases Special Grant Review Committee (July 11 & 12)
2005  Reviewer for Current Medical Research and Opinion
2005- 2010  Regular Member of the Neurological Aging, and Musculoskeletal Epidemiology (NAME) Study Section (Oct 17-18)
2005  Reviewer for NIH Special Emphasis Panel/Scientific Review Group ZRG1 HOP-G (02) (Nov 18)
2005  Reviewer for NIH Special Emphasis Panel (ZRG1 MOSS) (Nov 30)
2005- 2012  Reviewer for current medical research and opinion
2006  Regular Member of the Neurological Aging, and Musculoskeletal Epidemiology (NAME) Study Section (Feb 23-24, Oct 25-26)
2006  Reviewer for the NIH Special Emphasis Panel (ZRG1 HOP B02M) (Nov 27)
2006  Reviewer for the NIH Special Emphasis Panel (ZRG1 MOSS-1) (Nov 28)
2006  International reviewer for Canadian Institutes of Health Research (Dec)
2006  Reviewer for International Journal for Vitamin and Nutrition Research (Sep 2006)
2007  Regular Member of the NIH Neurological Aging, and Musculoskeletal Epidemiology (NAME) Study Section (Feb 22-23)
2007  Reviewer for the NIH Special Emphasis Panel (ZRG1 HOP K02) (Feb 23)
2007  Reviewer for the NIAMS Special Emphasis Panel (ZAR1 CHW-M (M1)): Women’s Health and Osteoporosis (March 13)
2007  Regular Member of the NIH Neurological Aging, and Musculoskeletal Epidemiology (NAME) Study Section (June 21-22)
2007- 2012  Member of the International Advisory Board of Current Medical Research and Opinion (CMRO) (journal)
2007  Member of the NIH Neurological Aging, and Musculoskeletal Epidemiology (NAME) Special Panel Meeting (July 27)
2007-Now  Member of the osteoporosis working group in the Cardiovascular Health Study (CHS).

2007 Deputy chair, The NIH Neurological Aging, and Musculoskeletal Epidemiology (NAME) Study Section (October 18-19)

2008 Regular Member of the NIH Neurological Aging, and Musculoskeletal Epidemiology (NAME) Study Section (Feb12-13).

2008 Reviewer, NIAMS/NIH Small Research Grants Review (ZAR1 EHB-H (M1)) (March 20)

2008 Reviewer, Special Emphasis Panel on Skeletal Muscle and Exercise Physiology (ZRG1 MOSS_L (07) (March 20)

2008 Regular Member of the NIH Neurological Aging, and Musculoskeletal Epidemiology (NAME) Study Section (Oct 6-7).

2008 NIAMS R03 small grant project review. ZAR1 EHB-D M1 1 (Nov 20).

2008 Reviewer for Susan G. Komen, NBLP (Dec 2)

2008-2012 Sarcopenia Workgroup for NIH foundation

2009-2012 Women’s Health Initiative Workgroup on Bone Fractures

2009-2012 Women’s Health Initiative Workgroup on Ethnicity

2009 Regular Member of the NIH Neurological Aging, and Musculoskeletal Epidemiology (NAME) Study Section (Feb 3-4).

2009 NIH Reviewer for Challenge Grant (June)

2009 Reviewer for Genome Medicine

2009 Reviewer for Ethnicity and Health

2009 Editing Board Member for Chinese Journal of Anthropology (人类学报) Beijing, China

2009 Reviewer for Susan G. Komen

2010 NIH reviewer for Member Conflict: NAME and IRAP (Teleconference) ZRG1 PSE-E (02) M 02/10/2010

2010 NIH reviewer for National Institute of Arthritis and Musculoskeletal and Skin Diseases Special Emphasis Panel ZAR1 CHW (M2) 02/16/2010

2010 NIH Program (PhenX project) Skin, Bone, Muscle, and Joint Working Group


2011 Advanced Body Composition Workshop (Organized by the Chinese Society for Anatomical Sciences, August 5-8, 2011, Gуйюan, Guizhou, China), Workshop Director.


2012 Reviewer for NIA/NIH, NATIONAL INSTITUTE ON AGING, BETHESDA, MD (250632). March 9th 2012.


2012—Now Oversea Expert by the Chinese Academy of Sciences (CAS)
2013 Reviewer for NIH ZRG 1 PSE-D 90 A, Population studies and epidemiology area review, March 13, 2013
2013 Reviewer for NIAMS/NIH ZAR1 XZ (M1) Ancillary Studies Review June 7 2013
2013 Reviewer for NIA/NIH 2013/10 ZAG1 ZIJ-8 (04) Mobility and aging June 20 2013
2013 Reviewer for 2013/10 ZAR1 HL (M1) Arthritis and Musculoskeletal and Skin Diseases Clinical Trials Conflict Review Meeting (Teleconference) July 28th, 2013
2013 Reviewer for NIH 2014/01 ZAR1 XZ (M1) Core Centers for Musculoskeletal Biology and Medicine P30 Review Panel, Nov 7-8, 2013
2014 Review for CDC, National Center on Birth Defects and Developmental Disabilities Special Emphasis Panel: Pilot Interventions to Promote the Health of People with Blood Disorders, ZDD1 EEO (01), April 08, 2014 - April 09, 2014
2014 Review for NIH ZAG1 ZIJ-3 (O5) A PROOF OF CONCEPT RANDOMIZEDTRIAL OF MULTIMODALITY INTERVENTION IN HIP FRACTURE. July 9th, 2014.
2014 September 2014, I was invited to give a presentation in Beijing at the inauguration of the International Communication Society of Chinese Medicine under the World Federation of Chinese Medicine Societies. Subsequently, I was elected to the executive committee of that Society and the committee for standardization in Chinese Medicine of the World Federation of Chinese Medicine Societies.
2015 Review for NIH ZRG1 MOSS-S (10) B meeting, scheduled for 06/29/2015-06/29/2015 June 29, 2015
2015 Review for NIAMS Musculoskeletal P30 Core Center Grant Review meeting--November 12-13, 2015
2016 Review for CDC, DP16-001 PRAMS Component D February 4th 2016
2016 Review for Special Emphasis Panel/Scientific Review Group 2016/05 ZAG1 ZIJ-3 (M2), March 29 2016
2017 Review for NIAMS P30 Core Centers for Clinical Research review meeting June 29 &30, 2017
2017 Review for NIH R15, MOSSD82, November 6, 2017
2018 Review for NIH R15, MOSSD82, Musculoskeletal, Oral, Skin, Rheumatology and Rehab Sciences AREA, March 7, 2018

Departmental/College/University Committees

- 7 -
1996 - 2001  Member, the Arizona Prevention Center and Arizona Arthritis Center
Osteoporosis Prevention Program
1998 - Now  Member, Cancer Prevention and Control Section, Arizona Cancer Center
1998 – 2002  Faculty Member in the Interdisciplinary Graduate Program of
Epidemiology, University of Arizona Graduate College
1998 - Now  Faculty in the Cancer Prevention and Control Fellowship Program (R25),
Arizona Cancer Center
1998 -1999  Admissions faculty interviewer for the College of Medicine, University of
Arizona
1999 – 2000  Member, Review Committee for the Dean’s Dissertation Fellowship,
College of Medicine, University of Arizona
1999 - 2000  Member, Arizona College of Public Health Implementation Working
Group for Academic Research
2000  Member, Admissions Committee, Epidemiology Concentration, Master
of Public Health, College of Public Health, University of Arizona
2001  Member, Admission Committee, Epidemiology Interdisciplinary
Graduate Program, College of Public Health, University of Arizona
2003  Reviewer, Agriculture Experiment Station Research, College of Agriculture,
University of Arizona
2003 - 2007  Member of MPH program committee
2003 – 2005  Member of policy and procedure committee, MPH program
2003 - 2005  Member of the executive committee of the Graduate Program of
Epidemiology
2004 - 2005  Member of the division peer review committee
2004 - 2005  Member of the search committee for associate professor/professor in the
division of environmental and occupational health
2005-2006  Member of the search committee for association professor/professor of
epidemiology
2005-2009  Member of the Student Affairs Committee, Mel and Enid Zuckerman College
of Public Health
2005-2006  Dean Swanson’s five-year performance review committee
2006-2007  Education Committee, Mel and Enid Zuckerman College of Public Health
2006-2008  Member, promotion and tenure committee, Mel and Enid Zuckerman
College of Public Health
2007  College Representative to Graduate Council, Graduate College, University of
Arizona
---Serve on the review committee for the University of Arizona Graduate
Teaching and Mentoring Award (reviewed 15 nomination packets)
2007-2010  University Committee on Academic Freedom and Tenure, University of
Arizona
--Serve on a special hearing panel in the fall of 2007 (three days hearing plus
preparation for the hearing and a written report to the UA president)
--Serve on a special hearing panel in the spring of 2008 (four days hearing
plus preparation for the hearing and a written report to the UA president)
--Serve on a special hearing panel in the fall of 2008 (one day hearing plus
preparation and final report to the UA president)
---Serve on a special hearing in the spring of 2009 (two days hearing,
preparation and report)
2007-2008  Dean Search Committee for Mel and Enid Zuckerman College of Public
Health, University of Arizona.
2007- 2009 Undergraduate education working group, Mel and Enid Zuckerman College of Public Health, University of Arizona

2007 Steering committee member for the Integrative Health Sciences Facility Core at the Southwest Environmental Health Science Center (SWEHSC), University of Arizona.

2007-Now Epidemiology Program Admission Committee, MEZCOPH, University of Arizona (review applications for MPH, MS and PhD programs)

2007 Serve as an interviewer to candidates of the director of the Arizona Arthritis Center

2007 Serve as an interviewer to candidates of the director of the Arizona Center on Aging

2007-2008 Epidemiology Forum 2008 (Developed an oral session on Epidemiology and Aging and invited speakers for the oral session)

2009 Public Health Informatics workgroup, Division of Epidemiology and Biostatistics, MEZCOPH

2009---Now Dean’s Council, Mel and Enid Zuckerman College of Public Health

2010—Now Member of Advisory Board for Arizona Center on Aging

2012—Now Member of a UA special committee appointed by UA President

2013—2016 Member of Distinguished Professor Review Committee appointed by the UA Provost

2013--2015 Member of the steering committee for UA department heads (Heads-up)

2017---Now Member of core leadership group for UA Aging Initiatives (review pilot grant applications, direct seminar, and prepare for Pepper Center Application)

PUBLICATIONS/CREATIVE ACTIVITY:

- Manuscripts (Published and accepted)


22. Chen Z, Maricic M, Pettinger M, Ritenbaugh C, Lopez AM, Barad DH, Gass M, Leboff MS, Bassford TL. Osteoporosis and Rate of Bone Loss among


34. Wright NC; Riggs GK; Lisse JR; **Chen Z.** Self-Reported Osteoarthritis, Ethnicity, BMI and other Associated Risk Factors in Postmenopausal Women---Results from the Women's Health Initiative. J Am Geriatr Soc 2008; 56: 1736-1743. [PMID:18662212]


45. Farr JN, **Chen Z**, Lisse JR, Lohman TG, Going SB. Relationship of total body fat mass to weight-bearing bone volumetric density, geometry, and strength in young girls. *Bone* 2010 Apr; 46(4): 977-84. [PMID: 20060079]


48. Chlebowski RT; Chen Z; Cauley JA, Rodabough R, McTiernan A; Lane DS; Manson JE; Snetselaar L; Yasnseem S; O'Sullivan MJ; Stafford M; Hendriks SL; Robert B. Wallace RB. Oral Bisphosphonate Use and Breast Cancer Incidence in Postmenopausal Women. *J Clin Oncol*. 2010 Aug 1; 28(22): 3582-90. [PMID: 20567009]


80. **Chen Z.** Historical Relationships between Biological Anthropology and Body Composition. ACTA Anthropologica Sinica, August 2013, 32(3).
82. JH Stern, AS Grant, CA Thomson, L Tinker, L Hale, KM Breman, NF Woods, **Z Chen**. Short sleep duration is associated with decreased serum leptin, increased energy intake, and decreased diet quality in postmenopausal women. Obesity, Dec 2013. PMID: 24347344.


Invited Book Chapters:


Invited Book Review

Book edited

Peer-reviewed Abstracts:


Caire JG, Arendell L, James R, Chen Z. Body composition and mammographic density in Hispanic and non-Hispanic White women by menopausal status (Poster, APHA annual meeting, Boston MA Nov 4-8, 2006).

Venker C, James R, Wright N, Nicholas S, Chen Z. Ethnic Differences in Body Composition: Results from the Women’s Health Initiative (Oral Presentation, APHA annual meeting, Boston MA Nov 4-8, 2006).


Bassford T, Beck TJ, Wu G, Cauley JA, LaCroix AZ, Lewis CE, Chen Z. Changes in hip geometric structures with aging- Longitudinal Data Analysis from the Women’s Health


M.S. LeBoff 1, R. Garg1, T. Beck2, J. Cauley3, G. Wu4, B. Lewis5, D. Nelson6, A. LaCroix7, Z. Chen4 Geometric Evidence of a Modeling Defect in Type 2 Diabetic Women Enrolled in the Women's Health Initiative as a Potential Explanation for Increased Fracture Risk" has been selected by the 2008 Program Committee to be presented as an oral presentation at the forthcoming ASBMR 30th Annual Meeting being held September 12-16, 2008 in Montréal, Québec, Canada.

Lee JS, Fink, H, Buzkova P, Vu J, Carbone L, Chen Z, Cappola A, Robbins J. “Subclinical Thyroid Disease Predicts Hip Fracture The Cardiovascular Health Study” has been selected by the 2008 Program Committee to be presented as an oral presentation at the forthcoming ASBMR 30th Annual Meeting being held September 12-16,2008 in Montréal, Québec, Canada.

Z Chen; M. Maricic, AK Aragaki, C. Mouton; L Arendell; AM Lopez; T Bassford; RT Chlebowski. Fracture risk increases after diagnosis of breast or other cancers in postmenopausal women----- Results from the Women’s Health Initiative. American College of Epidemiology meeting, September 14-16th, 2008. Tucson Arizona, USA (Winner: Third Place for the Best Poster Presentation).


NC Wright, JR Lisse, BT Walitt, CB Eaton, Z Chen. Self-Reported Arthritis Increases Fracture Risk---Results from the Women’s Health Initiative. (Presented at the American College of Rheumatology for presentation at the annual meeting, Philadelphia, October 17-21, 2009).


2015 **Clinical and translational research for TCM**. Symposium of Evidenced Medicine for TCM. Invited speaker Nov 8th-9th 2015, Xi’an, China


**WORK IN PROGRESS**

- **Peer-reviewed Manuscripts Submitted**


  Physical Activity and Fracture Risk in the Women’s Health Initiative Observational Study Jane A. Cauley, **Chen Z**, Rebecca Jackson, Joseph C. Larson, Andrea LaCroix, Michael LaMonte, Meryl S. LeBoff, Xiaodan Mai, Judith K. Ockene, John Robbins, Jean Wactawski-Wende (Submitted to WHI for internal review in 2016).

  Genome-wide association study of habitual physical activity in over 277,000 UK Biobank participants identifies multiple variants including CADM2 and APOE Author: Yann Klimentidis, David Raichlen, Jennifer Bea, David Garcia, Lawrence Mandarino, Gene Alexander, **Chen Z**, and Scott Going (International Journal of Obesity, revision Nov 27, 2017)

- **Book Chapters**

  Book--- Medical Anthropology

  1. 第四节 体成分的不同 李文慧, Scott Going, 陈昭
     
     Section 4 Differences in Body Composition Wenhui Li, Scott Going, **Zhao Chen** to be published in 2018

  2. 第十八章 医学人类学与全球健康 Mark Nichter 文，戴红良译，陈昭编写
     
     Chapter 18 Medical Anthropology and Global Health, Mark Nichter, Hongliang Dai (Translate) and **Zhao Chen** (Edit) to be published in 2018

- **Peer-reviewed Abstracts Submitted**

  None
Symposiums (co-chair and presenter)

Pre-Symposium Sarcopenia Definition – An Evidence-basis approach, Co-Chair and presenter, Chen Z.
**Time:** July 9, 2008 8-12 am  
**Place:** Columbia University, New York  
**Co-chairs:** Tamara Harris, MD, National Institute on Aging, U.S. & Zhao Chen, PhD, MPH, University of Arizona, U.S.  
**Other presenters:** Marjolein Visser, PhD, VU University Amsterdam, the Netherlands; Lynn Marshall, ScD, Oregon Health and Science University, U.S.; Scott Going, PhD, University of Arizona, U.S.

August 1-2, 2008. III IANA (International Academy on Nutrition and Aging) meeting.
Symposium III Sarcopenia---How to define it? Co-Chair and presenter, Chen Z.
**Time:** August 1, 2008 1:00 -3:00 pm  
**Place:** Hyatt Regency Tamaya Resort & SPA, Santa Ana Pueblo, NM USA.  
**Co-chairs:** Tamara Harris, MD, National Institute on Aging, U.S. & Zhao Chen, PhD, MPH, University of Arizona, U.S.  
**Other presenters:** Marjolein Visser, PhD, VU University Amsterdam, the Netherlands; Lynn Marshall, ScD, Oregon Health and Science University, U.S.; Scott Going, PhD, University of Arizona, U.S.

**Time:** November 21-25, 2008  
**Place:** Washington DC  
**Co-chairs:** Tamara Harris, MD, National Institute on Aging, U.S. & Zhao Chen, PhD, MPH, University of Arizona, U.S.  
**Other presenters:** Marjolein Visser, PhD, VU University Amsterdam, the Netherlands; Lynn Marshall, ScD, Oregon Health and Science University, U.S.; Scott Going, PhD, University of Arizona, U.S.

July 5-9, 2009 Paris. XIXth IAGG World Congress of Gerontology and Geriatrics
Defining Sarcopenia-Summing up an evidence-based approach from population studies
Co-Chairs: Zhao Chen, PhD, MPH, University of Arizona Tamara Harris, MD, National Institute on Aging, U.S
Other presenters: Marjolein Visser, PhD, VU University Amsterdam, the Netherlands; & Peggy Cawthon, PhD, San Francisco Coordinating Center, California Pacific Medical Center Research Institute

August 5-8 2011, Advanced Body Composition Workshop, Guiyang, Guizhou, China
- Organized by the Chinese Society for Anatomical Sciences  
- Workshop director and faculty: Zhao Chen, PhD, MPH, University of Arizona
MEDIA

2001    Interviewed by NPR radio station, KUAZ TV station and NBC local TV station regarding my research on women's breast and bone density.

2002    TV interview by Telemundo regarding my research on women's breast and bone density.

2003    Interview with International medical news group about fracture risk among breast cancer survivors (12230 Wilkins Avenue, Rockville, MD 20852, Phone (301)816-8721, fax: (301)816-8719) will be appeared on OBGYN NEWS in November, 2003

2003    Media briefing at the ASBMR meeting on breast cancer survivor and fracture study.

2005    Telephone Interview with Tucson Citizen (3. 11. 05)

2005    Telephone interview with Health Day (3.11.05)

2005    Telephone Interview with NBC (3. 14.05)

2005    TV Interview with Univision, Tucson. KUVE46/38 (3.16.05)

2005    Telephone interview with Emergency Medicine News (3. 24.05)

2005    Interview with Arizona Daily Star (3. 22.05--- story appeared on Sunday 3. 24.05)

2006    Interview with PBS TV station about vitamin D and calcium study in the Women’s Health Initiative

2008    Interview with ABC News The story about breast cancer risk and bone density was featured on ABC News Now on July 28, 2008

2008    Interview with KGUN 9 Local news media station KGUN 9 covered the breast cancer and bone density story on July 28, 2008, on their 5 p.m. newscast


2008    Interview with Ivanhoe Productions. About the Gail Score paper. August 12, 2008

2011    Interview with TV4 on Height and cancer incidence in the Million Women Study
SCHOLARLY PRESENTATION

- **Seminar and University Presentations**

1997 **Chen Z** Body Composition Measurements. At the Friday Seminar of the Arizona Arthritis Center, University of Arizona, Tucson.

1997 **Chen Z** Body Composition and Bone Mineral Density Among Prostate Cancer Patients. At the Cancer Prevention and Control Wednesday Seminar of the Arizona Cancer Center, University of Arizona, Tucson.

2000 **Chen Z** State of the Art of Calcium Research, at the Women’s Health Initiative participants (outreach).

2000 **Chen Z** and Marshall J. Should Energy Intake be Corrected in Epidemiologic Studies of Diet and Disease? Arizona Cancer Center, University of Arizona.

2000 **Chen Z** Osteoporosis in Minority Populations, Arizona Arthritis Center, University of Arizona.

2000 **Chen Z** Exercise and osteoporosis prevention (outreach for Tucson osteoporosis support group).

2000 **Chen Z** Osteoporosis Screening (Epidemiology Seminar).

2001 **Chen Z** BMD: in Osteoporosis and other Diseases (outreach).

2002 **Chen Z** New findings on breast cancer and osteoporosis (outreach at the UA Hispanic Alum. Association).

2003 **Chen Z** Osteoporosis and breast cancer: are they associated? (Nutritional Science Seminar, UA).

2004 **Chen Z** Risk of Clinical Fractures among Breast Cancer Survivors (March 3, 2004 Department of Medicine Grand Rounds)

2004 **Chen Z** Cancer and Aging (March 4, 2004, Epidemiology Seminar)


2004 **Chen Z** Bone Density and Body Composition Research In the Women’s Health Initiative. First Women’s Health Research Symposium, National Center of Excellence in Women’s Health, University of Arizona *(invited speaker, September 15, 2004)*.

2006 **Chen Z**. Datablize Seminar. College of Medicine. University of Arizona (Invited speaker, September 5, 2006)

2006 **Chen Z**. Women’s Health beyond Reproductive Age. Epidemiology Seminar. Mel and Enid Zuckerman College of Public Health. University of Arizona (October 12, 2006)

2007 **Chen Z**. How is breast cancer related to osteoporosis? CPC Grand Rounds seminars, Arizona Cancer Center, University of Arizona (October 24, 2007).

- **Conferences Presentations (peer-reviewed or invited)**

1993 **Chen Z**. Predictors of bone mineral density in postmenopausal women. Annual meeting of the American Association of Physical Anthropology, Toronto.


1998  **Chen Z.** Body Composition in Men with Prostate Cancer Receiving Different Modalities of Androgen Ablation. The Annual Meeting of the American Society of Bone Mineral Research, San Francisco.

1999  **Chen Z.** Osteoporosis Screening Program with Mobile DXA at the Work Site. Fourth Annual Meeting of the International Society for Clinical Densitometry, New Orleans.


1999  **Chen Z.** Body Composition and Bone Mineral Density. The Third International Congress of Osteoporosis, China.


2000  **Chen Z.** What do we know about osteoporosis in Asian American and Native American Women? The 2000 American Geriatrics Society/American Federation for Aging Research Annual Scientific Meeting, May 17-21 (*Invited Speaker*)


2001 Chen Z, Nguyen PT, Maricic MJ, Ahmann FR, Dalkin BL. Low bone density is associated with reduced lean soft tissue mass in prostate cancer patients treated with androgen ablation. BMS/ECTS June 2001, Spain (accepted for poster presentation).


2008  **Chen Z**. Sarcopenia in the Women’s Health Initiative, 3rd International Academy on Nutrition and Aging Meeting (August 1, 2008)


2009  **Chen Z**. Sarcopenia Interstudy Workgroup & Weight Loss Results. July 6, 2009 Paris XIXth IAGG World Congress of Gerontology and Geriatrics


2017  **Chen Z**. Invited speaker for UACOM APAMSA Region VII Conference. Are Older Asian Americans Healthier than their peers? March 18, 2017
PROFESSIONAL IMPROVEMENT

- Professional organizations

American Society for Epidemiologic Research
American Society for Bone and Mineral Research

GRANTS AND CONTRACTS

- International
  Confucius Institute Headquarters, Beijing China (Zhao Chen PI)  2011-2017
  Confucius Institute at the University of Arizona  2017 budget: $257,206
  A continuous contract with China to facilitate learning Chinese language and culture in Arizona.  35% effort as the Director (UA)

With this contract UA is also eligible to have financial support for visiting scholars and teachers, global CI conference in China, summer camp in China and education delegation to China. The yearly financial support (including funding and personnel) by this contract is over one million dollars.

- Federal

Current
NIH/NIAM AR066601 (Kent Kwoh PI)  7/1/2014---6/30/2019
Long-term Significance of Pre-radiographic Lesions in Persons at Risk for Knee OA  4% yr1-2, 5% yr3, 8% yr4-5
$4,551,125

This study adds a 120-month visit to the Osteoarthritis Initiative (OAI) in a cohort of participants who were Kellgren and Lawrence radiographic grade 0 or 1 in one or both knees at baseline to imaging biomarkers associated with the development of incident radiographic OA.
Role: Co-investigator

NIH 1R01 AG055018-01 (PI: Andrew Odegaard)  06/15/2017 - 03/31/2021
Abdominal adipose tissue depots and cardiometabolic disease risk in postmenopausal women  10% years 1-5
$396,456

New technology will derive abdominal visceral adipose tissue (VAT) values from existing DXA scans in the Women’s Health Initiative to evaluate the relationship between VAT and cardiometabolic disease risk.
Role: Site PI

Pending
R01CA214514 (Bea)  04/01/2017 – 03/31/21  1.2 calendar
Adipose tissue study is a secondary analysis of data from the Women’s Health Initiative (WHI), including existing DXA Images. This study will utilize a new technology to derive levels of specific types of abdominal fat, visceral and subcutaneous fat, from existing dual-energy X-ray absorptiometry (DXA) scans in the Women’s Health Initiative (WHI) DXA cohort (approximately 11,000 women).

Role: Co-I

R01HL137803 (Klimentidis) 07/01/2017 – 06/30/21 0.36 calendar
NIH $150,000

Generic Risk Factors and Mechanisms Underlying Lipedema
We seek to robustly identify genetic risk factors and mechanisms underlying this disease.
Role: Co-I

R21NR017271 (Slack) 07/01/2017 – 06/30/19 0.60

NIH $150,000

Pharmacists’ Self-Management of Chronic Pain: An Opportunity to Explore the Relationship between Self-Management Strategies and Outcomes
This project will serve as platform to develop a study to examine the differences between opioid use and pain management techniques and the effects of biological variables such as age, race and gender.
Role: Co-I

Not funded
R01 NCI (Jennifer Bea PI) 4/1/2017-3/31/2021
Adipose tissue study is a secondary analysis of data from the Women's Health Initiative (WHI) 10%
including existing DXA Images
Co-investigator

R01 NIH (Yann Klimentidis PI) 7/1/2017—6/30/2021
Genetic Risk Factors and Mechanisms Underlying Lipedema 3%
Co-investigator

R01 NIH (Z CHEN) 9/1/2016-8/31/2021 10%
Risk factors for poor physical function, low muscle strength and frailty in older Tibetans living at high altitudes

R21 AR068022 4/1/2015-3/31/2017 10%
NIAMS/NIH (Z CHEN)
Weight loss, pain-reduction and mobility improvement with electro-acupuncture
in Hispanic and non-Hispanic whites with knee osteoarthritis --- A pilot and feasibility study

NSF (Samy Missoum PI) 8/1/15 –7/31/18 10%
$966,288 (Total)

Static and Dynamic Fusion of Experimental/Clinical and Computational Data for the Construction of Risk Models
Co-PIs: Zhao Chen (Award credit 20%), Shashi Phoha (external)

Past
2P30ES006694-16A1 04/30/2012--03/31/2015 10%
NIEHS/NIH
Southwest Environmental Health Sciences Center
(SWEHSC) $1,050,000($1,590,750)
The mission of SWEHSC is to understand the Mechanisms behind the modulation of human disease risk by environmental exposures unique to the Southwest Co-investigator

R01 AG027373-01A1 (Z CHEN) 09/15/07 –06/30/14 5%
NIH/NIA
Biomarkers and Genetic Factors Related to Sarcopenia in Older Women
PI $612,099 (first year total)
$3,049,243 (total)
To investigate genetic determinants and biological indicators for skeletal muscle loss in older Hispanic and non-Hispanic white women.

1R21AR060811-01 (Z CHEN & Samy Missoum) 09/01/2011 – 08/31/2014 5%
NIH/NIA
A New Hip Fracture Risk Prediction Tool Based on Common Predictors and Hip Geometry
To develop a new prediction model for hip fractures in older women using hip geometry and other conventional predictors as innovative modeling approaches

Mini grant by MEZCOPH (Z CHEN) 05/01/2011—12/30/2014 2%
Reduce Social Isolation in the Elderly $40,000 (Total)
To pilot an investigation on whether using physical activity and computer instruction can reduce social isolation in the elderly.

R01 HL050775-01 A1 (S GOING) 07/01/07 – 06/30/11 5%
NIH
Exercise and Bone Development In Young Girls
Co-Investigator
To assess the effects of weight-bearing exercise on bone strength and bone macro-architectural structure after one and two years of intervention in pre- and early-pubertal girls.

1 R01 AG029133-01 (Z CHEN) 05/15/07 – 4/29/11 15%
NIH/NIA $640,805 (total)
**Anemia and Its Relationship with Sarcopenia, Physical Function, and Mortality**
**PI**
To investigate health impacts of anemia and to examine best hemoglobin cutoff points for defining anemia in different age and ethnic groups of older women.

1R01 AR049411-01 (Z CHEN)
NIH/NIAMS 07/01/03 - 06/30/10 30%
**Longitudinal Changes in Hip Geometry and Skeletal Muscle**
$1,731,411 (Direct)
$2,063,019 (Total)
**PI**
To study aging and intervention effects on bone strength and the impact of muscle loss on bone strength in both the observational study and clinical trials in the Women's Health Initiative Study.

Supplement to 1R01 AR049411-01 (Z CHEN) 07/01/06 – 6/30/10 1%
NIH/NIAMS $108,245 (total)
**Longitudinal Changes in Hip Geometry and Skeletal Muscle: Research Supplements to Promote Diversity in Health Related Research.**
**PI & Mentor**
To provide research training opportunity for a minority doctoral candidate to engage in arthritis research among multiethnic groups of older people.

ES06694 SWEHSC pilot program (Z CHEN) 01/25/2008-01/24/2009 1%
NIH $40,000 (Total direct)
**PI**
**Arsenic Exposure and Women's Health**
To explore the impact of arsenic exposure on multiple health outcomes, including osteoporosis, sarcopenia, and breast cancer, among older Arizona women.

1 K01 AR 02060-01(CHEN) 10/1/97 - 6/30/2003 75%
NIH $337,434
**Ethnicity, Body Composition, Bone Density and Breast Cancer**
**Principal Investigator**

Canyon Ranch Restricted Funds (CHEN) 2/15/99-6/30/01 2%
Arizona Prevention Center, U of A $20,000
**Increased Osteoporosis Awareness Among the Elderly Living in Inner City**
**Principal Investigator**

Cancer Prevention and Control Small Grant (CHEN) 2000-2001 5%
Arizona Cancer Center/NCI $31,246
**Feasibility Study on Breast and Bone Density Measurements**
**Principal Investigator**
<table>
<thead>
<tr>
<th>Grant Number</th>
<th>Grant Title</th>
<th>Start Date</th>
<th>End Date</th>
<th>Role</th>
<th>Funding Agency</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>RO1 CA78802 (GIULIANO)</td>
<td>Four Corners Collaborative Case-Control Study</td>
<td>7/1/99-6/30/04</td>
<td>1%</td>
<td>Co-investigator</td>
<td>NIH/NCI</td>
<td>$144,260</td>
</tr>
<tr>
<td>R03CA105948-01 (MASKARINEC)</td>
<td>Breast Density, IGF-I, &amp; Prolactin in Four Populations</td>
<td>09/01/03 – 09/01/05</td>
<td>1%</td>
<td>Co-investigator</td>
<td>NIH/NCI Small Grants Program for Epidemiology</td>
<td>$100,000 (direct costs)</td>
</tr>
<tr>
<td>DAMS 17-02-1-02721</td>
<td>Relationship between Mammographic Density and IGF Levels among Hispanic and Non-Hispanic White Women</td>
<td>July 02- June 05</td>
<td>1%</td>
<td>Mentor</td>
<td>Department of Defense (ARENDELL)</td>
<td>$65,498</td>
</tr>
<tr>
<td>NIH-2R01-AR39559-04A3 (BASSFORD)</td>
<td>Relationship between Mammographic Density and IGF Levels among Hispanic and Non-Hispanic White Women</td>
<td>10/1/94 - 9/14/2005</td>
<td>1%</td>
<td>Co-investigator</td>
<td>NIH</td>
<td>$12,000,000</td>
</tr>
<tr>
<td>Supplementary Grant for WHI (CHEN)</td>
<td>Increase recruitment of Native American Principal Investigator</td>
<td>9/30/97-9/14/05</td>
<td>1%</td>
<td></td>
<td>NIH</td>
<td>$20,000</td>
</tr>
<tr>
<td>NIH/NIA (1 R01 026463-01) AG (J. CAULEY)</td>
<td>Hip Strength Across the Menopausal Transition</td>
<td>07/01/07 – 06/30/12</td>
<td></td>
<td>Consultant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pilot project funded by Arizona Center on Aging</td>
<td>Reduced phosphate absorption is associated with the development of osteoporosis in older population.</td>
<td>08/30/09 -09/01/10</td>
<td>$36,667 (total)</td>
<td>Co-PI with Xu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Past State Core Grant (CHEN)</td>
<td></td>
<td>7/1/97 – 6/30/01</td>
<td>20%</td>
<td></td>
<td>Arizona Arthritis Center</td>
<td>$60,000</td>
</tr>
<tr>
<td>Interdisciplinary Program for Osteoporosis Research</td>
<td></td>
<td></td>
<td></td>
<td>PI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Travel Grant (CHEN)</td>
<td></td>
<td>3/25/99-4/5/99</td>
<td></td>
<td>Foreign Travel Grant to the</td>
<td>University of Arizona International Affairs</td>
<td>$500</td>
</tr>
</tbody>
</table>
Third International Congress of Osteoporosis

➢ Industry

Past
Educational Grant (CHEN) Marion Lab. Kansas City 4/1/93 – 3/31/95 25%
Relationship between Bone Mineral Density, Body Composition, Nutrient Intake and Physical Activity $5,000
PI

➢ Private Foundation

Past
The Susan G. Komen Breast Cancer Foundation (CHEN) 3/1/2001-10/31/2004 10%
The Association between Mammographic Density and Bone Mineral Density among White and Hispanic Women $249,924 (Total)
PI

Eli Lilly and Company (CHEN) 12/15/05 ---12/14/06 5%
Bone Density and Breast Cancer Risk $78,880
PI

The Susan G. Komen Breast Cancer Foundation (C. THOMSON) 5/15/04 – 7/15/06 2%
Green Tea Intervention for Weight Gain $248,988 (Total)
Prevention among Women with Breast Cancer
Co-investigator

This is a true and accurate statement of my activities and accomplishments. I understand that misrepresentation in securing promotion and tenure may lead to dismissal or suspension under ABOR Policy 6-201 J. 1. B.

Zhao Chen, Ph.D., MPH

___________________________   ______________________
Signature      Date
EVALUATION OF TEACHING AND ADVISING

- Extent of Teaching -

1996-1997  EPID515H Cancer Epidemiology (team teaching)
1997-1998  EPID545 Nutritional Epidemiology (guest lectures on body composition measurements, elderly nutrition)
1998 Fall EPID596C Quantitative Epidemiology (co-director, 15 students)
1999 Fall EPID596C Quantitative Epidemiology (co-director, 17 students)
2000 Spring EPID545 Nutritional Epidemiology (guest lectures on body composition measurements, elderly nutrition)
2000 Fall EPID596C Advanced Epidemiology (co-director, 21 students)
2000 Fall CPH682 Maternal & Child Health Programs & Policy (guest lecture on osteoporosis screening)
2001 Spring EPID545 Nutritional Epidemiology (guest lectures on body composition measurements, elderly nutrition)
2001 Fall EPID599 Independent Study (Jennifer Skye Nicolas)
2001 Fall EPID596C Advanced Epidemiology (co-director, 8 students)
2001 Fall CPH682 Maternal & Child Health Programs & Policy (guest lecture on osteoporosis screening)
2002 Spring EPID599 Independent Study (Jennifer Skye Nicolas)
2002 Spring EPID699 Independent Study (Leslie Arendell)
2002 Fall EPID573C Advanced/Quantitative Epidemiology (director, 7 students)
2003 Spring EPID673 Epidemiology of Aging (co-director, 4 students)
2003 Spring EPID545 Nutritional Epidemiology (guest lectures on body composition measurements)
2003 Fall EPID573C Advanced/Quantitative Epidemiology (director, 15 students)
2004 Spring EPID673 Epidemiology of Aging (co-director, 6 students)
2004 Spring EPID599 Independent Study (1 unit) Zuohe Song
2004 Spring EPID910 Thesis (4 units) Zuohe Song
2004 Spring EPID900 Research (2 units) Jennifer Skye Nicholas
2004 Fall EPID 573C Advanced/Quantitative Epidemiology (director, 20 students)
2005 Spring EPID673 Epidemiology of Aging (co-director, 7 students)
2005 Fall EPID573C Advanced Epidemiology (director, 10 students)
2005 Fall EPID-699-028 Independent Study
2006 Spring EPID673 Epidemiology of Aging (co-director, 4 students)
2006 Spring CPH 596n Internship Preparation (co-director, 39 students)
2006 Spring CPH 545 Nutritional Epidemiology (guest lecture, 7 students)
2006 Spring CPH 652 Grantsmanship for a Winning Proposal (guest lecture, 15 students)
2006 Spring PhPr 865 Public Health Principles for Pharmacists (guest lecture, 31 students)
2006 Fall EPID 573C Advanced/Quantitative Epidemiology (director, 10 students)
2006 Fall CPH 596n Internship Preparation Class (director, 15 students)
2006 Fall EPID 900 (042) Research 4 units for Skye Nicolas
2006 Fall EPID 699 (028) Independent study 3 units for Clair Venker
2006 Fall EPID 900 (001) Research 4 units for Leslie Arendell
2007 Spring CPH 596n Internship Preparation Class (director, 42 students)
2007 Spring EPID 699 Section 001 (4 units). Independent study for Nicole Wright
2007 Fall EPI 573C Advanced/Quantitative Epidemiology (director, 8 students)
2008 Spring  EPID 699 Section 040 (2 units) independent study for Nicole Wright.
2008 Spring  EPID 699 (1 unit) independent study for Huapin Sun
2008 Spring  CPH 630 Maternal and Child Health Epidemiology (guest lecture, 6 students)
2008 Spring  CPH 596n Internship Preparation Class (director, 51 students)
2008 Spring  CPH 545 Nutritional Epidemiology (guest lecture, 12 students)
2008 Fall  EPID 573C Advanced Epidemiology (director, 7 students)
2008 Fall  CPH 596n Internship Preparation Class (online director, 25 students)
2008 Fall  EPID 699 Independent study (3 units) for David Mosley
2009 Spring  EPID 699 Independent study (3 units) for Lysbeth Ford
2009 Spring  CPH 596n Internship Preparation Class (director, 33 students)
2009 Fall  EPID 573C Advanced Epidemiology (director, 10 students)
2009 Fall  CPH596n Internship Preparation Class (director, 21 students)
2009 Fall  EPID 900 Research (5 units) for Guanglin Wu
2010 Spring  CPH 596n Internship Preparation Class (director, 36 students)
2010 Spring  EPID 920 Dissertation (3 units) for Leslie Arendell
2010 Spring  EPID 920 Dissertation (6 units) for Nicole Wright
2011 Spring  CPH678 Principle of Public Health Informatics (3 units) (director, 2 students—
new course and was tested)
2011 Fall  EPID696a Epidemiology Seminar (1 unit) (director, 16 students)
2011 Fall  EPID573c Advanced Epidemiology (3 units) (director, 13 students)
2012 Spring  EPID573a Basic Principle of Epidemiology (3 units) (director, 37 students)
2012 Spring  EPID696a Epidemiology Seminar (1 unit) (co-director, 17 students)
2012 Spring  EPID678 Principle of Public Health Informatics (3 units) (director, 9
Students — 2 in person section and 7 online section)
2012 Fall  EPID573c Advanced Epidemiology (3 units) (director, 21)
2013 Spring  EPID573a Basic Principle of Epidemiology (3 units) (director, 27 students)
2013 Spring  CPH 678 Principles of Public Health and Health Informatics (3 units) (director,
6 students)
2013 Spring  CPH 909 Masters’ Report (1 unit) (director, 3 students)
2013 Spring  EPID 900 Research (1 unit)(director, 1 student)
2013 Spring  EPID 920 Dissertation (2 units) (director, 2 students)
2013 Summer CPH 909 Master’s report (1 unit) (director, 1 student)
2013 Fall  CPH 699 Independent Study (1 unit) (director, 1 student)
2013 Fall  CPH 900 Research (1 unit) (director, 1 student)
2013 Fall  CPH 909 Master’s Report (1 units) (director, 2 students)
2013 Fall  EPID920 Dissertation (1 unit) (director, 1 student)
2013 Fall  CPH573c Advanced Epidemiology (3 units) (director, 20 students)
2014 Spring  CPH 678 Principles of Public Health and Health Informatics (3 units) (Co-
director with Angelika Gruessner) (9 students)
2014 Spring  CPH 459 Special topics—data management (1 unit) (13 students)
2014 Fall  EPID 573c Advanced epidemiology (3 units) (23 students)
2015 Spring  CPH 678 Principles of Public Health and Health Informatics (3 units) (12
students) (Co-director with Angelika Gruessner)
2015 Fall  EPID 573c Advanced epidemiology (3 units) (30 students)
2016 Spring  CPH 678 Principles of Public Health and Health Informatics (3 units) (5
students) (Director)
2016 Spring  EPID 920 (3 units) Dissertation (1 student)
2016 Summer CPH459/559 (6 units) Integrating Chinese Medicine with Public Health (11 students)
2016 Summer CPH909 Master Report (1 unit) (1 student)
2016 Fall EPID 573c Advanced Epidemiology (3 units) (27 students)
2016 Fall CPH699 Independent Study (2 units, one student) (3 units, one student)
2016 Fall CPH909 Master Report (1 unit, one student) (2 units, one student) (3 units, one student)

2017 Spring
2017 Summer
2017 Fall EPID 573c Advanced Epidemiology (3 units) (20 students)

- Teaching Award and Grants

Current

Human Disease and the Interplay Between Genes and the Environment (NIEHAT32 HuGER Training Grant. Total cost = $2,077,895. Funding period = 07/01/2008 to 06/30/2012). PI: Dr. Terrece Monks. My role: one of the seventeen core faculty cross campus.

Past

- Core faculty of the Arizona Geriatric Education Center (Grant #1 D31 HP 80006).
- Faculty Mentor of Cancer Prevention and Control Training Grant (NCI R25-CA09629)

- Individual Student Contact

Advising

Semester
1999-2000
Lily Besantiago (Undergraduate student, project advisor)
Michael L. Voloudakis (Epi MPH, internship advisor)
Rafael Noriega (Epi MPH, academic advisor)

2000-2001
Leslie Arendell (Epi MS, thesis director)
Cshandar Davis (Epi MPH, project advisor)
Ellen Cussler (Epi MS, thesis committee member)
Joe Miller (Epi MPH, internship committee member)

2001-2002
Leslie Arendell (Ph.D Candidate, dissertation director)
Jennifer S. Nicholas (Epi MS student, thesis director)
Roberta Bruhn (Epi Ph.D. Candidate, project advisor)
Jennifer Stewart (Epi MS student, project advisor)

2002-2003
Leslie Arendell (Epi Ph.D., dissertation director)
Jennifer S. Nicholas (Epi MS, thesis director)
Roberta Bruhn (Epi Ph.D., project advisor)
Jennifer Stewart (Epi MS, project advisor)
Zuohe Song (Epi MS, academic advisor)

2003-2004
Leslie Arendell (Epi Ph.D., dissertation director)
Jennifer S. Nicholas (Epi Ph.D., dissertation director)
Zuohe Song (Epi MS, thesis director)
Deepti Eshpande (Epi MPH, academic advisor)
Deborah Dufficy (Epi MPH, academic advisor)
Sanja Kaluza (Epi MPH, academic advisor)
Karen Cheman (Epi MPH, academic advisor)
Carols Moll (Epi MS, project advisor)
Roberta Bruhn (Epi Ph.D., project advisor)
Ling Chen (EPI Ph.D., dissertation director)
Nicole Wright (EPI MPH, project advisor)

2004-2005
Leslie Arendell (Epi Ph.D., dissertation director)
Jennifer S. Nicholas (Epi Ph.D., dissertation director)
Deepti Eshpande (Epi MPH, academic advisor) (Graduated in May 2005)
Deborah Dufficy (Epi MPH, academic advisor, received MPH award and graduated in May, 2004)
Sanja Kaluza (Epi MPH, academic advisor)
Karen Cheman (Epi MPH, academic advisor and internship committee chair)
Carols Moll (Epi MS, project advisor and second reader for internship)
Roberta Bruhn (Epi Ph.D., project advisor)
Ling Chen (EPI Ph.D., dissertation director)
Nicole Wright (EPI MPH, project advisor and internship advisor)
Graciela Caire Juvera (Postdoctoral student and EPI MPH, academic advisor)
Guanglin Wu (Epi PhD., dissertation director)
Micky Levendusky (Epi MS, thesis director)
Cheryl LaCasse (Nursing Ph.D., doctoral committee member)

2005-2006
Leslie Arendell (Epi Ph.D., dissertation director)
Jennifer S. Nicholas (Epi Ph.D., dissertation director)
Nicole Wright (EPI MPH & Ph.D., academic advisor, internship advisor & dissertation director)
Graciela Caire Juvera (Postdoctoral student and Epi MPH, academic advisor & internship advisor, Dra. Graciela Caire Juvera
Centro de Investigación en Alimentación y Desarrollo, A.C.
Coordinación de Nutrición
Depto. Nutrición Pública y Salud
Tel. 289-2400 ext. 395
Fax: 280-0094)
Guanglin Wu (Epi PhD., dissertation director)
Two students (Nicole Wright & Skye Nicholas) received FASEB MARC travel award (the student presenter’s award) for their presentation at the ASBMR.

2006-2007
Leslie Arendell (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor)
Jennifer S. Nicholas (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor)
Nicole Wright (EPI Ph.D., academic advisor, dissertation director & doctoral committee chair)
Guanglin Wu (Epi PhD., academic advisor & dissertation director)
Cheryl LaCasse (Nursing Ph.D., doctoral committee member)
Graciela Caire Juvera (Postdoctoral student and Epi MPH, academic advisor & internship advisor, graduated in August 2006)
Sanja Kaluza (Epi MPH, academic advisor, graduated in May 2006)
Juliana Pugmire (Epi MPH, academic advisor & internship director Graduated in August 2007)
Raysenia James (Epi MPH, academic advisor)
Katie Holton (Epi MPH & Nutrition Ph.D., academic advisor & dissertation committee member for public health minor, received MPH in May 2006 with an internship presentation award)
Michelle Gamber (Epi MPH, academic advisor and internship advisor)
Robert Bagnoud (EPI Ph.D. Doctoral dissertation committee chair)
Julian Esparza (EPI Ph.D. Doctoral dissertation committee member)
TereZ Yonan (EPI MPH, Internship committee member, Graduated in May 2007)
Claire Venker (EPI Ph.D., academic advisor)
Shannon Rock (EPI MPH, academic advisor)
Jennifer Williams (EPI MPH, academic advisor)
Jessica Wong (EPI MPH, academic advisor)
Lori Stratton (Biostats MPH, internship preceptor, graduated in August 2006 and received internship presentation award)
David Mosley (EPI, Ph.D, doctoral dissertation committee chair)

2007-2008
Leslie Arendell (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor)
Jennifer S. Nicholas (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor), Native American
Nicole Wright (EPI Ph.D., academic advisor, dissertation director & doctoral committee chair), African American
Guanglin Wu (Epi PhD., academic advisor & dissertation director) (international student)
Cheryl LaCasse (Nursing Ph.D., doctoral committee member) (international student)
Raysenia James (Epi MPH, academic advisor & internship committee member, graduated in Nov. 2007) (Native American)
Katie Holton (Epi MPH & Nutrition Ph.D., academic advisor & dissertation committee member for public health minor, received MPH in May 2006 with an internship presentation award)
Michelle Gamber (Epi MPH, academic advisor, graduated in November 2007)
Roberta Bruhn (EPI Ph.D. Doctoral dissertation committee chair, graduated in May 2008 RELATIONSHIP BETWEEN GLAUCOMA AND SELENIUM LEVELS IN PLASMA AND AQUEOUS HUMOR)
Julian Esparza (EPI Ph.D. Doctoral dissertation committee member) (International student)
TereZ Yonan (EPI MPH, Internship committee member, Graduated in May 2007) (Hispanic)
Claire Venker (EPI Ph.D., academic advisor)
Shannon Rock (EPI MPH, academic advisor, graduated in May 2008)
Jennifer Williams (EPI MPH, academic advisor, graduated in May 2008)
Jessica Wong (EPI MPH, academic advisor) (Asian American)
David Mosley (EPI, Ph.D, academic advisor)
Chase (Vanessa) Barnes (EPI MPH, academic advisor) (African American)
Jennifer Wright (AzCC R25 postdoctoral fellow, Mentor)
Gail Braford (EPI MS, thesis committee chair and graduate advisor) (Asian American)
Huaping Sun (EPI PhD minor chair) (International student)
Pooja Budhiraja (Renal fellow at the University of Arizona Medical Center, research mentor)
Karen D'Huyvetter (EPI PhD, Dissertation Committee Chair)
Anahi Arana (MPH, internship committee member)

Two students (Nicole Wright & Skye Nicholas) received FASEB MARC travel award (the student presenter’s award) for their presentation at the ASBMR September 2007.

Three students (Guanglin Wu, Nicole Wright & Skye Nicholas) received ASBMR student travel award.

Nicole Wright received the first prize award for her poster at the Epidemiology Forum, MEZCOPH, spring 2007.

Nicole Wright received the second prize award for her poster at the UA student poster presentation, fall 2007.

Successfully supported Lubna Shaikh’s application to Asian American Faculty, Staff, and Alumni Associate Grants Program to support 2007 Diversity Celebration.

2008-2009
Leslie Arendell  (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor)
Jennifer S. Nicholas  (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor), Native American
Nicole Wright  (EPI Ph.D., academic advisor, dissertation director & doctoral committee chair), African American
Guanglin Wu  (Epi PhD., academic advisor & dissertation director) (international student)
Cheryl LaCasse  (Nursing Ph.D., doctoral committee member)
Katie Holton  (Epi MPH & Nutrition Ph.D., academic advisor & dissertation committee member for public health minor, received MPH in May 2006 with an internship presentation award)
Claire Venker  (EPI Ph.D., academic advisor)
Jessica Wong  (EPI MPH, academic advisor) (Asian American)
David Mosley  (EPI, Ph.D, academic advisor)
Chase (Vanessa) Barnes  (EPI MPH, academic advisor) (African American)
Jennifer Wright  (AzCC R25 postdoctoral fellow, Mentor)
Gail Braford  (EPI MS, thesis committee chair and graduate advisor, Graduated in August of 2008) (Asian American)
Huaping Sun  (EPI PhD minor chair) (International student)
Pooja Budhiraja  (Renal fellow at the University of Arizona Medical Center, research mentor)
Karen D'Huyvetter  (EPI PhD, Dissertation Committee Chair)
Anahi Arana  (MPH, internship committee member) (Graduated in 2009)
Andriene Grant  (EPI PhD, academic advisor, Fulbright scholar from Jamaica) (International student)
Josh Farr  (PhD, doctoral committee member. Physiological sciences)

2009-2010
Leslie Arendell  (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor)
Jennifer S. Nicholas  (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor), Native American
Nicole Wright  (EPI Ph.D., academic advisor, dissertation director & doctoral committee chair), African American (graduated in Aug 2010)
Guanglin Wu  (Epi PhD., academic advisor & dissertation director) (international student)
Cheryl LaCasse  (Nursing Ph.D., doctoral committee member)
Katie Holton  (Epi MPH & Nutrition Ph.D., academic advisor & dissertation committee member for public health minor, received MPH in May 2006 with an internship presentation award)
Claire Venker  (EPI Ph.D., academic advisor)
Jessica Wong  (EPI MPH, academic advisor) (Asian American)
David Mosley  (EPI, Ph.D, academic advisor)
Jennifer Wright  (AzCC R25 postdoctoral fellow, Mentor)
Huaping Sun  (EPI PhD minor chair) (International student)
Pooja Budhiraja  (Renal fellow at the University of Arizona Medical Center, research mentor)
Karen D'Huyvetter  (EPI PhD, Dissertation Committee Chair)
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<tr>
<th>Name</th>
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<th>Details</th>
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</thead>
<tbody>
<tr>
<td>Andriene Grant</td>
<td>(EPI PhD, academic advisor, Fulbright scholar from Jamaica)</td>
<td>(International student)</td>
</tr>
<tr>
<td>Josh Farr</td>
<td>(PhD, doctoral committee member. Physiological sciences)</td>
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<tr>
<td>Timothy Krone</td>
<td>(EPI MPH, academic advisor)</td>
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<tr>
<td>Katelyn Galloway</td>
<td>(EPI MPH, academic advisor)</td>
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<tr>
<td>Kyle Mckeown</td>
<td>(EPI MPH, academic advisor)</td>
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<td>Martin, Brittany</td>
<td>(EPI MPH, academic advisor)</td>
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<tr>
<td>Xiao (Lucy) Chen</td>
<td>(EPI MPH, academic advisor)</td>
<td></td>
</tr>
<tr>
<td>Yee Tchao</td>
<td>(EPI MPH, academic advisor)</td>
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Nicole Wright received the best student presentation award at the American College of Rheumatology Annual Meeting in 2009.

**2010-2011**
- Leslie Arendell: (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor)
- Jennifer S. Nicholas: (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor), Native American
- Guanglin Wu: (Epi PhD., academic advisor & dissertation director) (international student)
- Claire Venker: (EPI Ph.D., academic advisor)
- David Mosley: (EPI, Ph.D, academic advisor)
- Andriene Grant: (EPI PhD, academic advisor, Fulbright scholar from Jamaica) (International student)
- Josh Farr: (PhD, doctoral committee member. Physiological sciences) (Graduated in May, 2011)
- Timothy Krone: (EPI MPH, academic advisor) (Graduated in Aug, 2011)
- Katelyn Galloway: (EPI MPH, academic advisor) (Graduated in May, 2011)
- Kyle Mckeown: (EPI MPH, academic advisor and internship chair)
- Martin, Brittany: (EPI MPH, academic advisor and internship chair)
- Xiao (Lucy) Chen: (EPI MPH, academic advisor and internship chair)
- Yee Tchao: (EPI MPH, academic advisor and internship chair)
- Mohammed Alzoubaidi MD: (EPI MPH, academic advisor and internship chair)
- Wangjing Ke: (EPI MPH, academic advisor and internship chair)
- Jennifer Menefee: (EPI MPH, academic advisor and internship chair)
- Connie Chung: (EPI MPH, academic advisor and internship chair)
- Rebecca Ragar: (EPI MPH, academic advisor)
- Wayne Gerard: (EPI MPH, academic advisor)
- Jessica Wong: (EPI MPH, academic advisor) (Asian American)

**2011-2012**
- Leslie Arendell: (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor) (Drop out in May 2012)
- Jennifer S. Nicholas: (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor), Native American
- Guanglin Wu: (Epi PhD., academic advisor & dissertation director) (international student) (Graduated in August 2012)
Claire Venker (EPI Ph.D., academic advisor)
David Mosley (EPI, Ph.D, academic advisor)
Andriene Grant (EPI PhD, academic advisor, Fulbright scholar from Jamaica) (International student)
Jessica Wong (EPI MPH, academic advisor) (Asian American)
Kyle Mckeown (EPI MPH, academic advisor and internship chair) (Graduated in May 2012)
Martin, Brittany (EPI MPH, academic advisor and internship chair) (Graduated in May 2012)
Xiao (Lucy) Chen (EPI MPH, academic advisor and internship chair) (Graduated in May 2012)
Yee Tchao (EPI MPH, academic advisor and internship chair) (Graduated in May 2012)
Mohammed Alzoubaidi MD (EPI MPH, academic advisor and internship chair)
Wangjing Ke (EPI MPH, academic advisor and internship chair)
Jennifer Menefee (EPI MPH, academic advisor and internship chair)
Connie Chung (EPI MPH, academic advisor and internship chair)
Rebecca Ragar (EPI MPH, academic advisor)
Amit Arora (EPI MS, academic advisor)

2012-2013

Jennifer S. Nicholas (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor), Native American
Claire Venker (EPI Ph.D., academic advisor and committee chair)
David Mosley (EPI, Ph.D, academic advisor and committee chair, graduate in December 2013)
Andriene Grant (EPI PhD, academic advisor and committee chair, Fulbright scholar from Jamaica) (International student), graduate in August 2013)
Jessica Wong (EPI MPH, academic advisor) (Asian American)
Mohammed Alzoubaidi MD (EPI MPH, academic advisor and internship chair)
Wangjing Ke (EPI MPH, academic advisor and internship chair, graduate in May 2013)
Jennifer Menefee (EPI MPH, academic advisor and internship chair, graduate in May 2013)
Connie Chung (EPI MPH, academic advisor and internship chair, graduate in May 2013)
Rebecca Ragar (EPI MPH, academic advisor, graduate in May 2013)
Cheryl LaCassee (Nursing Ph.D., doctoral committee member)
Amit Arora (EPI MS, academic advisor)
Zachariah William Peterson (EPI MPH, academic advisor)
Steven Hadeed (EPI MPH, internship director)

2013-2014

Jennifer S. Nicholas (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor), Native American
Claire Venker (EPI Ph.D., academic advisor and committee chair)
Cheryl LaCasse (Nursing Ph.D., doctoral committee member)
Amit Arora (EPI MS, academic advisor, graduated in August 2014)
Zachariah William Peterson (EPI MPH, academic advisor)
Steven Hadeed (EPI MPH, internship director, graduated in May 2014)

2014-2015
Jennifer S. Nicholas (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor), Native American
Claire Venker (EPI Ph.D., academic advisor and committee chair)
Cheryl LaCasse (Nursing Ph.D., doctoral committee member)
Don Hoon Lee (EPI MPH, academic advisor and internship chair)
Chien-Yu Chen (Minor advisor)
Katheryn Angelia (EPI MPH, academic advisor)
Tanzida Zaman (EPI MPH, academic advisor)
Kimerly Fajardo (EPI MPH, academic advisor)
Michelle Martin (EPI MPH, academic advisor)
Sho Taniguchi (EPI MPH, academic advisor and internship committee member)
Nirmal Singh (EPI MPH, academic advisor and internship committee chair)

2015-2016
Jennifer S. Nicholas (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor), Native American
Claire Venker (EPI Ph.D., academic advisor and committee chair)
Don Hoon Lee (EPI MPH, academic advisor and internship chair)
Chien-Yu Chen (Minor advisor)
Katheryn Angelia (EPI MPH, academic advisor)
Tanzida Zaman (EPI MPH, academic advisor)
Kimerly Fajardo (EPI MPH, academic advisor)
Michelle Martin (EPI MPH, academic advisor)
Sho Taniguchi (EPI MPH, academic advisor and internship committee member)
Nirmal Singh (EPI MPH, academic advisor and internship committee chair)
Kristi Bischoff (EPI MPH, academic advisor and internship committee chair)
Maisel Goe (EPI MPH, academic advisor)
Shawna Follis (EPI PhD, academic advisor and doctoral committee chair)
Christopher Wendel (EPI PhD, dissertation committee member)
Eric James Tomkins (EPI MPH, academic advisor)
Xin Tang (EPI PhD, academic advisor)

2016-2017
Jennifer S. Nicholas (Epi Ph.D., doctoral committee chair, dissertation director & academic advisor), Native American
Claire Venker (EPI Ph.D., academic advisor and committee chair)
Don Hoon Lee (EPI MPH, academic advisor and internship chair)
Chien-Yu Chen (Minor advisor)
Sho Taniguchi (EPI MPH, academic advisor and internship committee member)
Nirmal Singh (EPI MPH, academic advisor and internship committee chair)
Kristi Bischoff  (EPI MPH, academic advisor and internship committee chair)
Maisel Goe  (EPI MPH, academic advisor)
Shawna Follis  (EPI PhD, academic advisor and doctoral committee chair)
Christopher Wendel  (EPI PhD, dissertation committee member)
Eric James Tomkins  (EPI MPH, academic advisor)
Xin Tang  (EPI PhD, academic advisor)
Elena Sheveleva  (EPI MPH, academic advisor)
Sachin Misha  (EPI MPH, academic advisor)

2017-2018
Claire Venker  (EPI Ph.D., academic advisor and committee chair)
Shawna Follis  (EPI PhD, academic advisor and doctoral committee chair)
Christopher Wendel  (EPI PhD, dissertation committee member)
Teresa Mangaogang  (EPI MPH, academic advisor)
Elena Sheveleva  (EPI MPH, academic advisor)
Sachin Misha  (EPI MPH, academic advisor)
Xin Tang  (EPI PhD, academic advisor)

- Office hours
On average, four hours/week are designated as office hours to meet with students (other than the independent studies, and advising for thesis or dissertation). I also encourage students to make appointment to come to see me. On average, I spend 8-10 hours/week meeting with and writing to current students and potential applicants.

- Dissertations in progress
Claire Venker  (EPI Ph.D., Doctoral committee chair)
Shawna Follis  (EPI PhD, Doctoral committee chair)
Xing Tang  (EPI PhD, Doctoral committee chair)

- Development and scholarly activity supporting teaching; use of technology; etc.
I developed a large simulative epidemiological study database, which has been used in the EPI596C and later EPI573C by students for understanding chance, bias, confounding factors, and measurement errors in epidemiological study design, conduction and data analysis.

Since July 2002 Dr. Jane Mohler and I initiated a new course "Epidemiology of Aging". We have developed and implemented a class syllabus and lecture series contain aging and epidemiologic concepts and theories as well as real samples from epidemiologic research. In this course we encourage active learning and aim to integrate in-class and field experiences on aging research for students from diverse backgrounds.
In 2008, I worked with the Academic Affair office in the college for developing an online course for MPH internship preparation.

I have continue serving as a mentor for AZ-PRIDE program since 2014, which trains researchers from under represent populations. I developed online modules to provide study design and data analysis support to the fellows in the program.

- **Evaluation of Teaching and Teaching Portfolio**
  - Student Evaluations of Teaching – Quantitative Summary (see TCE)
  - Peer Review (Div. Director)
    - Instructional preparation and planning – EPID 573C, EPID673, CPH596n
    - Scholarly activity supporting teaching
      - Attended Epidemiology conferences (supported by mentor)
      - Provide datasets to a number of classes and host internships
  - Contributions to Departmental Teaching – Critical, valuable and highly rated (see letter from Division Head)
  - Comparison to other faculty (positive, according to Div. Dir. & teaching evaluations from students)
  - Assessment of success of candidate’s students – Leslie Arendell has received a grant from the DOD for biomarker analyses in her dissertation research, and Jennifer S. Nicolas has received a minority supplement grant from NIH for supporting her dissertation research on physical function measurements among the participants in the Women’s Health Initiative project. Leslie Arendell is also a NIH R25 predoctoral fellow at the Arizona Cancer Center. Nicole Wright has successfully applied and received a Travel Award from Federation of American Societies for Experimental Biology (FASEB) Minority Access to Research Careers (MARC) program this year to present a paper at the ASBMR meeting in September 23-27 2005. Both Nicole Wright and Jennifer S. Nicolas received FASEB MARC Travel Award for their presentation at the ASBMR meeting in September 16-19, 2007. Shawna Follis has applied for minority supplement grant in October, 2017.

- Among the students who graduated, Rafael Noriega was studying medicine at the University of Chicago. Jennifer Stewart is working at the Arizona State Health Department. Dr. Joe Miller is professor of Ophthalmology, Optical Science and Public Health, and the Head of Department of Ophthalmology. Mr. Zuohe Song is currently working for the genetic analysis core at the Arizona Cancer Center. Dr. Deepti Eshpande is an assistant professor at the Children Hospital at the University of Arizona. Dr. Roberta Bruhn is working for a company in Phoenix conducting clinical trials. Dr. Nicole Wright is an Assistant Professor at the University of Alabama Birmingham. Dr. Guanglin Wu is working in a Clinical Research Organization, Canton, Michigan. Kathleen Holton: [http://www.american.edu/cas/faculty/holton.cfm](http://www.american.edu/cas/faculty/holton.cfm)

MPH in EPI. Now at American University in Washington DC. Nichole
Wright, PHD, is assistant professor at the University of Alabama, Birmingham.
CURRICULUM VITAE

Heidi E. Brown, Ph.D., M.P.H.

Department of Epidemiology and Biostatistics
Mel & Enid Zuckerman College of Public Health
University of Arizona
1295 N Martin
Tucson, AZ 85724-5211
P.O. Box 245211
Phone: (520) 626-2262
Fax: (520) 626-2767
E-mail: heidibrown@email.arizona.edu

Chronology of Education
1995 B.S., Department of Psychology, Virginia Polytechnic Institute & State University, Major: Psychology, Minor: Biology

1999 M.P.H., Division of Global Health, School of Public Health, George Washington University, Major: International Health Promotion

Rabies in Fairfax County, VA, USA, Masters of Public Health Thesis, George Washington University, Gilbert Kombe, Chair

2006 M.Phil., Division of Epidemiology of Microbial Diseases, Department of Epidemiology, Yale University

2007 Ph.D., Division of Epidemiology of Microbial Diseases, Department of Epidemiology, Yale University

Into the Environment of Mosquito-Borne Disease: Spatial Analysis of Vector Distribution Using Traditional and Remotely Sensed Methods, Doctor of Philosophy Dissertation, Yale University, Durland Fish, Chair

Chronology of Employment
2004 – 2007 Graduate Student, Vector Ecology Laboratory, Department of Epidemiology of Microbial Diseases, Yale University, New Haven, CT


2008 – 2009 Oak Ridge Institute for Science and Education (ORISE) Post-Doctoral Fellow, Division of Vector-borne Zoonotic Diseases, Bacterial Diseases Branch, Centers for Disease Control and Prevention, Fort Collins, CO

2009 – 2010 Senior Service Fellow, Division of Vector-borne Zoonotic Diseases, Bacterial Diseases Branch, Centers for Disease Control and Prevention, Fort Collins, CO

2010 – 2011 Visiting Scientist, Texas Biomedical Research Institute, San Antonio, TX

2010 – 2013 Postdoctoral Research Associate, Applied Climate for Environment and Society Laboratory, School of Geography and Development, University of Arizona, Tucson, AZ
2013 – Assistant Professor, Epidemiology and Biostatistics, Mel and Enid Zuckerman College of Public Health, University of Arizona, Tucson, AZ

2013 – Assistant Professor, Graduate Interdisciplinary Program - Entomology and Insect Science, University of Arizona, Tucson, AZ

2015 – Assistant Professor, School of Geography and Development, University of Arizona, Tucson, AZ

2015 – Assistant Professor, Graduate Interdisciplinary Program – Remote Sensing and Spatial Analysis, University of Arizona, Tucson, AZ

Honors and Awards
2004 – 2007 McDougal Fellow for Academic and Student Life- Community Service, Career Services and Coordinating Fellow, Yale University, New Haven, CT

2005 Student Presentation Award, “Predicting mosquito species distribution using satellite imagery,” Society for Vector Ecology 37th Annual Conference, Anchorage, AK


2005 Summer Travel Award, “Modeling of Vector-Borne Disease Epidemics,” Yale Council on Southeast Asia Studies, Yale University, New Haven, CT; Host: Institute for Research Development, Mahidol University, Bangkok Thailand

2015 Defense Advanced Research Projects Agency (DARPA) Forecasting Chikungunya Challenge Top Solver (with Joceline Lega, UA Mathematics)

2018 Excellence in Teaching Award, MEZCOPH

2019 Fulbright-CAPES Award, Oswaldo Cruz Foundation (FIOCRUZ), Rio De Janeiro, Brazil

Publications
Referred Journal Articles (*denotes dissertation work; **denotes student mentored)


42. Luz, P.M., Brown, H.E., Struchiner, C.J. “Disgust as an emotional driver of vaccine attitudes and uptake? A mediation analysis” Epidemiology and Infections in press.


**Chapters and Reports** (* denotes peer reviewed chapter; **denotes student mentored)


**Conferences/Scholarly Presentations (limited to period in current rank)**

**Seminars**

2013  “A Southwest Perspective on Climate Change and Health” Climate Assessment in the Southwest (CLIMAS) Seminar, University of Arizona, Tucson, AZ

2014  “Spatial Epidemiology with Applications to Vector-borne Diseases” Geography Colloquium, University of Arizona, Tucson, AZ

2014  “Climate Change and Health in the US Southwest” Community, Environment and Policy Seminar, Mel and Enid Zuckerman College of Public Health, University of Arizona, Tucson, AZ

2015  “Modeling the spread of chikungunya in the Caribbean and central America” Co-Presentation with Joceline Lega, Immunobiology MicroLunch, University of Arizona, Tucson, AZ

2017  “Environmental Influences on Vector-Borne Disease Spread” Epi Seminar, University of Arizona, Mel and Enid Zuckerman College of Public Health, University of Arizona, Tucson, AZ

2017  “Automating Mosquito Abundance Dynamics” USA National Phenology Network, University of Arizona, Tucson, AZ

2019  “Water Harvesting as Maladaptation with Respect to Vector-borne Diseases” at the CLIMAS Colloquium Series Research in the Urban Environment, University of Arizona, Tucson, AZ

**Conferences**


2014  Co-Host and Organizer of the H. pylori to stomach cancer and everything in-between symposium, MEZCPH, University of Arizona, Tucson, AZ

2016  “Health effects of climate: the US Southwest and Arizona” in the Social Justice Symposium on Climate and Health, University of Arizona, Tucson, AZ

2017  “Network-based modeling for chikungunya spread in Dominica” in a special session: Recent Advances in Mathematical Biology, Joint Mathematics Meeting, Atlanta, GA

2017  “Applying Vector-Borne Disease Projections for Climate and Health Strategic Planning in Arizona” co-presenter with Matt Roach, AZ Dept. Heath Services, Climate Sensitive Diseases and National Security: Predictions in Practice webinar hosted by CDC, USGCRP- CCHHG, and Office of Science and Technology Policy’s PPFST

2018  “Climate Effects on Mosquito-Borne Disease: Lessons from Arizona” Center for Health informatics, Computing and Statistics, Lancaster University Medical School, Bailrigg, Lancaster, UK

2018  “Climate influences on the distribution of mosquito vectors” in the MUVE Section Symposium: Predicting Vector-Borne Disease Spread in Changing Natural and Social Landscapes at the Entomological Society of America, Vancouver, Canada

2018  “Supporting Health Strategic Planning through Vector-Borne Disease Predictions” in the symposium, Developing Climate, Public Health, and Citizen Science Services to Predict and Prevent Climate-Sensitive Health Risks and Serve the Public Good at the 2018 Fall Meeting of the American Geophysical Union (AGU) in Washington DC

Conferences – Invited Speaker

2013  “Climate and the re-emergence of Eastern Equine Encephalitis in the northeastern US” Session 56 “Climate Change and Human Health” at The 5th International Conference on Medical Geology, Hilton Crystal City Hotel, Arlington, VA

2014  Presenter, “Climate Change and Health,” at the Wilderness Medical Society Annual Conference, Tucson, AZ

2016  “Bridging screening and cost-effectiveness” Oswaldo Cruz Foundation, National School of Public Health, Rio de Janiero, Brazil

2017  “The Changing Climate of Vector-borne Diseases” at Belmont University, College of Sciences & Mathematics, 12th Annual Environmental Science Lecture Series, Nashville, TN
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<th>Year</th>
<th>Event Description</th>
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<tr>
<td>2017</td>
<td>“Southwest Climate Change Impact on Health” at the Wilderness Medical Society Desert Medicine Conference, Tucson, AZ</td>
</tr>
<tr>
<td>2017</td>
<td>“Transdisciplinary Network-Based Infectious Disease Modeling” 6th International Conference on Mathematical Modeling, Tucson, AZ</td>
</tr>
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</table>
BIOGRAPHICAL SKETCH
Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. DO NOT EXCEED FIVE PAGES.

NAME: NAME: Ernst, Kacey C.
eRA COMMONS USER NAME (credential, e.g., agency login): KCERNST
POSITION TITLE: Associate Professor, School of Geography and Development, University of Arizona

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

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<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>Completion Date MM/YYYY</th>
<th>FIELD OF STUDY</th>
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<tr>
<td>Lawrence University, Appleton, WI</td>
<td>BA</td>
<td>06/1997</td>
<td>Chemistry and Interdisciplinary Science</td>
</tr>
<tr>
<td>University of Michigan, Ann Arbor, MI</td>
<td>MPH</td>
<td>06/2001</td>
<td>Epidemiology</td>
</tr>
<tr>
<td>University of Michigan, Ann Arbor, MI</td>
<td>PhD</td>
<td>12/2006</td>
<td>Epidemiology</td>
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A. Personal Statement
I am an infectious disease epidemiologist at the University of Arizona. My research broadly focuses on the nexus of humans, vectors, and environment. I have experience working in applied public health and as an academic. My work in public health practice garnered me experience in working with large population health datasets such as state and federal surveillance data and hospital discharge databases. I am currently the program director of epidemiology. I have experience conducting field investigations and am well aware of the challenges and obstacles encountered in research programs and the distinct limitations and possibilities that come from varying data sources. I also work collaboratively with climatologists and data scientists on climate and health issues. Recently, I have been working with Break Dengue to advise them on an integrative prediction system for dengue that leveraged data from Google, Kidenga, weather sources and surveillance data to build a platform for predicting and responding to dengue outbreaks.

B. Positions and Honors

Positions and Employment
2003 Bioterrorism Preparedness Coordinator, Milwaukee County/ Waukesha County Consortium, Wauwatosa, WI
2007-2008 Influenza Epidemiologist, Office of Infectious Disease Services, Arizona Department of Health Services, Phoenix, AZ
2008-2015 Assistant Professor, Division of Epidemiology and Biostatistics, College of Public Health, University of Arizona, Tucson, AZ
2015-present Associate Professor, Division of Epidemiology and Biostatistics, College of Public Health, University of Arizona, Tucson, AZ
2018-present Program Director of Epidemiology, College of Public Health, University of Arizona, Tucson, AZ

Honors and Awards (last 5 years)
2013 Hot Shot Award, The Arizona Partnership for Immunization annual award for advancing immunization in Arizona
2013 Award for Excellence in Research, Mel and Enid Zuckerman College of Public Health, University of Arizona
C. Contribution to Science

1. Understanding infectious disease transmission dynamics in the context of both environmental and social factors is the first step in the development and design of successful interventions. Much of my work has focused on developing a better understanding of how human and environmental factors influence the dynamics of malaria and dengue. Much of this work has been developed to try to inform the delivery of interventions, including the identification of factors that lead to spatial clustering of transmission. Targeting high risk areas can reduce transmission in both the area of high risk but also peripheral areas.


2. Once a transmission system is understood and interventions have been developed, it is important to examine the potential barriers to field implementation of the interventions. Much of my work has examined the determinants of uptake of well-established and novel control strategies including, bed net use, repellents, and vaccines.


3. Finally, policy changes are sometimes needed for broader scale implementation of control strategies. However, there is a significant disconnect between policies and public health action implemented to reduce disease transmission and evidence of their effectiveness. In my early work, I determined with collaborators that the policy of using microscopy in the diagnosis of malaria prior to treatment administration may miss cases of malaria that need treatment, particularly in low transmission areas such as the highlands of western Kenya. My work on vaccinations has examined the influence of differing Hepatitis A vaccination policies implemented in the
state of Arizona, still the state with one of the highest rates of Hepatitis A. In addition, the work on vaccination exemptions has moved towards the recommendation of stricter policies on vaccination administration by requiring health care provider signatures on exemption forms. We conducted research to determine how feasible the implementation would be in the state of Arizona. This work has been translated into action by the Arizona Health Department and by The Arizona Partnership on Immunizations (TAPI). In addition, we conducted a post-outbreak review of how the dengue outbreak in the Florida Keys was handled based upon feedback from key stakeholders.


Complete list of publications can be found here: 

D. Research Support (Relevant awards from total of over $6,500,000 in grants and contracts)

Ongoing Research Support

Centers for Disease Control and Prevention Walker (PI) 04/15/2017-04/14/2020
Impact of ULV adulticiding on the vectorial capacity of the Zika vector Aedes
The goal of this work is to determine the impact of routine vector control strategies, ULV and larviciding on Ae. aegypti indices, including age structure of Ae. aegypti. 
Role: co-I

Bill and Melinda Gates Foundation Hayden (PI) 08/010/2015-06/30/2019
Accelerate to Equal
The goal of the project is to examine the role of women in vector control at three distinct levels of engagement: programmatic, community and household, using case studies in malaria control.
Role: Site PI

NASA ROSES program Ernst (Site PI) 08/01/2016 – 07/30/2018
SMAP- informed vectorborne disease modelling. NASA ROSES program.
The goal of this project is to use the newly launched SMAP satellite to inform readings of humidity on the ground to improve process-based models of Ae. aegypti abundance in the US-Mexico border region.

Centers for Disease Control and Prevention Ernst (PI) 06/01/2018- 05/31/2019
Incorporating early warning systems into a community-based surveillance application
The goal of this project is to develop a notification system for users of Kidenga to alert them to periods of high risk of arboviral transmission

Relevant Completed Research Support

R01 AI091843-03 Ernst (PI) 09/01/2012 – 08/31/2017
NIH/NIAID          Ernst (PI)
On The Edge: Dengue and Climate
The goal of this project is to advance understanding related to the impact of climate on the possible emergence of dengue in the southern United States and northern Mexico.
Role: PI

Arizona Department of Health Services   Ernst/ Pogreba-Brown (MPI)         10/01/2015 – 07/31/2017
Enhancing community support of Non-pharmaceutical interventions
The goal of this project is to work with communities to identify barriers and solutions to implementing non-pharmaceutical interventions during outbreaks of infectious diseases.

1R56 AI091843-01                           Ernst (PI)       08/15/2011 – 07/31/2012
NIH/NIAID
On the Edge: *Aedes aegypti* dynamics on the boundary of its natural range
The goal of this project was to advance understanding related to the impact of climate on the possible emergence of Dengue in the southern United States and northern Mexico.
Role: PI

R15 AI100118-01        Ernst (PI)       07/31/2012 – 06/30/2016
NIH/ NIAID
Identifying Community-based strategies to improve insecticide-treated bednet use in western Kenya.
The goal of this project was to identify barriers and promoters of LLIN use in rural areas in western Kenya.

NSF RAPID         Ernst (Co-PI)      06/01/2016 – 05/31/2017
Determining the extrinsic incubation period (EIP) and transovarial transmission potential of Zika virus in *Aedes aegypti* mosquitoes.
The goal of this project was to conduct laboratory experiments to define the temperature specific EIP of Zika virus in *Aedes aegypti* and to determine if transovarial transmission was possible.

Skoll Global Threats Fund     Ernst (PI)              09/15/2015 – 02/28/2018
*Kidenga Fever: Viral Social Marketing for a Participatory App to Track Emerging Pathogens*
The goal of this project is to develop a community-based participatory surveillance application and educational platform for arboviral diseases in the United States.
Curriculum Vitae

Date Prepared: January 2019
Name: Leslie Virginia Farland
Department of Epidemiology and Biostatistics
Mel & Enid Zuckerman College of Public Health
University of Arizona
Work Email: lfarland@email.arizona.edu
Work Phone: 520-626-8025

Education

2010 B.A., honors Biological Sciences The University of Chicago
2012 Sc.M. Epidemiology Harvard T.H. Chan School of Public Health
2016 Sc.D. Epidemiology Harvard T.H. Chan School of Public Health
                            (Stacey A Missmer, ScD)

Faculty Academic Appointments

2016-2017 Research Associate Obstetrics, Gynecology, and Reproductive Biology Harvard Medical School
2017-2018 Instructor Obstetrics, Gynecology, and Reproductive Biology Harvard Medical School
2017-2018 Instructor Epidemiology Harvard T.H. Chan School of Public Health
2018- Assistant Professor Epidemiology and Biostatistics University of Arizona

Appointment at Hospitals/Affiliated Institution

2012-2014 Research Assistant Obstetrics and Gynecology Brigham and Women’s Hospital
2015-2016 Statistical Analyst Division of Reproductive Endocrinology and Infertility Brigham and Women’s Hospital
2016-2017 Research Scientist Division of Reproductive Endocrinology and Infertility Brigham and Women’s Hospital
2017-2018 Investigator Division of Reproductive Endocrinology and Infertility Brigham and Women’s Hospital
2018- Affiliate Member Cancer Prevention and Control Program University of Arizona Cancer Center

Farland, 1
Other Professional Positions

2013-2014  Biostatistics Consultant  World Health Organization (WHO), Guideline Development Group: IVF, ICSI sub-cluster

2017-      Epidemiology Consultant  Ovia Health
            Ovia Fertility Tracker and Ovulation Calculator App

Major Administrative Leadership

2016-2017  Assistant Director  Epidemiologic Research, Division of Reproductive Endocrinology, Dept of OB/GYN, Brigham and Women’s Hospital

2017-2018  Director  Epidemiologic Research, Division of Reproductive Endocrinology, Dept of OB/GYN, Brigham and Women’s Hospital

Committee Service

Local
2013-  Member  Coordinator  Boston Endometriosis Working Group, BWH  2014-2016

2016-2018  Member  Reproductive Endocrinology and Infertility Fellowship Selection Committee, BWH

2016-2018  Member  Reproductive Endocrinology and Infertility Fellowship Clinical Competency Committee, BWH

2016-2018  Member  Assisted Reproductive Technology Ethics Committee (ARTEC), BWH

2017-2018  Member  Doctoral Qualifying Exam Question Committee, Epidemiology Department, Harvard T.H. Chan School of Public Health

2017-2018  Member  Admissions Committee, Reproductive Perinatal and Pediatric Epidemiology, Harvard T.H. Chan School of Public Health

International
2016  Contributor  Fertility Status and Overall Health Workshop, Division of Reproductive Health, National Institutes of Child Health and Human Development, National Center for Chronic Disease Prevention and Health, Centers for Disease Control and Prevention

Professional Societies

2013-  Society of Epidemiologic Research
2015-  Abstract reviewer
2013- Society of Pediatric and Perinatal Epidemiologic Research
2015- Abstract reviewer

2015- American Society for Reproductive Medicine
2017- Endometriosis SIG abstract reviewer

2016- European Society of Human Reproduction and Embryology

**Editorial Activities**

Ad-hoc Manuscript Reviewer
- American Journal of Obstetrics & Gynecology
- BMJ
- Breast Cancer Research
- Cancer Causes and Control
- Fertility and Sterility
- Fertility Research and Practice
- Human Reproduction
- Obstetrics and Gynecology (Top 10% of Reviewers 2017)

**Honors and Prizes**

<table>
<thead>
<tr>
<th>Year</th>
<th>Award Description</th>
<th>Institution</th>
<th>Type of Award</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006-2010</td>
<td>Dr. Thomas Dooley Pre-Health Scholarship</td>
<td>Davenport, Iowa Public School District</td>
<td>Academic Scholarship</td>
</tr>
<tr>
<td>2009</td>
<td>Young Women of Achievement Award</td>
<td>Girl Scouts of Eastern Iowa and Western Illinois and The Women’s Connection</td>
<td>Academic and Community Service</td>
</tr>
<tr>
<td>2011-2012</td>
<td>Central Initiative Scholarship</td>
<td>Harvard T.H. Chan School of Public Health</td>
<td>Scholarship</td>
</tr>
<tr>
<td>2015</td>
<td>Society of Epidemiologic Research Travel Scholarship</td>
<td>Student/Post-doc Committee, Travel Award</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“A Prospective Study of Endometriosis and Risk of Breast Cancer”, Farland LV, Tamimi RM, Eliassen AH, Spiegelman D, Hankinson SE, Missmer SA</td>
<td>Society of Epidemiologic Research</td>
<td></td>
</tr>
<tr>
<td>2015-2016</td>
<td>P.E.O Scholar Award</td>
<td>P.E.O. International Scholarship</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>Student Travel Scholarship, Epidemiology Congress of the Americas “A Prospective Study of Endometriosis and Risk of Benign Breast Disease”, Farland LV, Tamimi RM, Eliassen AH, Spiegelman D, Hankinson SE, Collins L, Schnitt S, Missmer SA</td>
<td>National Institute of Environmental Health Sciences (NIEHS)</td>
<td>Travel Award</td>
</tr>
</tbody>
</table>
2016 Scientific Program Prize Paper
“Randomized Controlled Trial of Low (5%) vs. Ultralow (2%) Oxygen Tension for in vitro Development of Human Embryos”, Kaser DJ, Bogale B, Sarda V, Farland LV, Racowsky C
American Society of Reproductive Medicine (ASRM)

2016 Corporate Member Council In-Training Travel Grant
“Limitations on the Compensation of Gamete Donors: a Survey of Public Support and Opinion”, Lee MS, Farland LV, Missmer SA, Ginsburg ES
American Society of Reproductive Medicine (ASRM)

2018 Corporate Member Council In-Training Travel Grant
“Joint impact of maternal age and BMI on cumulative live birth following IVF” Goldman RH, Farland LV, Thomas AM, Zera CA, Ginsburg ES
American Society of Reproductive Medicine (ASRM)

2018 ASRM Scientific Program Prize Paper
American Society of Reproductive Medicine (ASRM)

Report of Funded and Unfunded Projects
Funding Information

Current
2017-2019 AfteR Treatment: a life course approach to infertility and family building patterns
Center for Infertility and Reproductive Surgery Research Award
Principal Investigator ($27,000)
Purpose: to investigate women’s long-term health and family building patterns 15-20 years after experiencing infertility

2018-2019 Endometriosis and Cardiometabolic Health Across the Life Course
Endometriosis Foundation of America
Principal Investigator ($15,000)
Purpose: A pilot study to investigate endometriosis and cardiometabolic conditions

Past
2012-2014 Reproductive, Pediatric, and Perinatal Epidemiology Training Grant
National Institute of Child Health and Human Development
T32 HD060454
Trainee (scholarship: $20,400 and stipend: $22,000)
2014-2015  Harvey V. Fineberg Fellowship in Cancer Prevention
            Harvard T.H. Chan School of Public Health
            Trainee (stipend: $20,000)

2015-2016  Rose Traveling Fellowship
            Department of Epidemiology and Biostatistics
            Harvard T.H. Chan School of Public Health
            Fellow (travel stipend: $6,000)

2015-2016  Cancer Prevention Fellowship
            National Cancer Institute
            3R25CA05771
            Trainee (scholarship: $20,400 and stipend: $22,000)

**Report of Local Teaching and Training**

**Formal Teaching of Students in Courses at Harvard T.H. Chan School of Public Health**

<table>
<thead>
<tr>
<th>Year</th>
<th>Course Description</th>
<th>Students</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>Advanced Reproductive Epidemiology (EPI 270)</td>
<td>15 masters and doctoral</td>
<td>One 2 hour lecture / year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>students</td>
<td></td>
</tr>
<tr>
<td>2014, 15, 16, 17, 18</td>
<td>Gender and Health: Introductory Perspectives (WGH 211)</td>
<td>30 masters and doctoral</td>
<td>One 2 hour lecture / year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>students</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>Epidemiological Research in Obstetrics and Gynecology (EPI269)</td>
<td>20 masters and doctoral</td>
<td>Co-course Instructor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>students</td>
<td>3 hours / week for 8 weeks</td>
</tr>
</tbody>
</table>

**Formal Teaching of Residents, Clinical Fellows at Harvard Medical School:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Course Description</th>
<th>Students</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016, 2017</td>
<td>Study Design and Analysis Seminar</td>
<td>8-10 clinical residents and fellows</td>
<td>OB/GYN Fellow Summer Research and Professional Development Sessions Two 2 hour lectures / year</td>
</tr>
</tbody>
</table>

**Formal Teaching of Students in Courses at the University of Arizona**

<table>
<thead>
<tr>
<th>Year</th>
<th>Course Description</th>
<th>Students</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>Chronic Disease Epidemiology (EPID 670)</td>
<td>15 masters and doctoral</td>
<td>Co-course Instructor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>students</td>
<td>3 hours / week for 16 weeks</td>
</tr>
<tr>
<td>2019</td>
<td>Epidemiology Spring Seminar (EPID 696A)</td>
<td>25 masters and doctoral</td>
<td>Instructor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>students</td>
<td>1 hour / week for 16 weeks</td>
</tr>
</tbody>
</table>

**Report of Regional, National, and International Invited Teaching and Presentations**
No presentations below were sponsored by outside entities

Local

2014 Lecture  
*Treatment of Infertility in the Nurses’ Health Study II*  
Women’s Health Symposium: A Life-course Approach to Women’s Health  
Harvard T.H. Chan School of Public Health, Boston, MA

2014 Lecture  
*Endometriosis and Risk of Breast Cancer*  
Dana Farber/Harvard Cancer Center Annual Celebration of Junior Investigators in Cancer Research. Boston, MA  
(*Plenary lecture based on abstract*)

2015 Lecture  
*A Prospective Study of Endometriosis and Risk of Breast Cancer*  
Dana Farber/Harvard Cancer Center Breast and Gynecologic Cancer Symposium. Boston, MA  
(*Plenary lecture based on abstract*)

2015 Lecture  
*Reproductive History in Relation to Plasma Steroid Hormone, Prolactin, and Growth Factor Concentrations in Premenopausal Women*  
Dana Farber/Harvard Cancer Center Annual Celebration of Junior Investigators in Cancer Research. Boston, MA  
(*Plenary lecture based on abstract*)

National

2015 Lecture  
*A Prospective Study of Endometriosis and Risk of Breast Cancer*  
Society of Epidemiologic Research, 48th Annual Meeting, Denver, CO  
(*Plenary lecture based on abstract*)

2017 Lecture  
*Hysterectomy with and without oophorectomy and cardiovascular disease risk*  
Society of Epidemiologic Research, 50th Annual Meeting, Seattle, WA  
(*Plenary lecture based on abstract*)

2017 Moderator  
*Women's Health is Public Health: Is the 21st Century a Level Playing Field for Women's Health Research?*  
Society of Epidemiologic Research, 50th Annual Meeting, Seattle, WA

2017 Lecture  
*Understanding Reproductive Health Across the Life Course: Infertility and Endometriosis*  
Department of Population, Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

2018 Lecture  
*Endometriosis and risk of adverse maternal and pregnancy outcomes*  
American Society of Reproductive Medicine, 74th Annual Meeting, Denver, CO  
(*Plenary lecture based on abstract*)

2018 Lecture  
*Cancer, subsequent subfertility, and fertility treatment: Massachusetts Farland,* 6
deliveries linked to SART CORS, hospital stays, and the state cancer registry
American Society of Reproductive Medicine, 74th Annual Meeting, Denver, CO (Plenary lecture based on abstract)

International

2016 Lecture Mediation Analysis: An Applied Example from Women’s Health Research
INSERM, Centre for Research in Epidemiology and Population Health (CESP) Institute Gustave Roussy, University of Paris, Villejuif, France

2016 Lecture A Prospective Study of Endometriosis and Benign Breast Disease
Epidemiology Congress of the Americas, Miami, FL (Plenary lecture based on abstract)

2017 Lecture Breastfeeding History and Risk of Endometriosis in the Nurses’ Health Study II
13th World Congress on Endometriosis, Vancouver, Canada (Plenary lecture based on abstract)

2017 Lecture Endometriosis and Risk of Skin Cancer: a Prospective Cohort Study
13th World Congress on Endometriosis, Vancouver, Canada (Plenary lecture based on abstract)

Report of Education of Patients and Service to the Community

Activities

2016 Lecture Endometriosis: A high-risk Population For Major Chronic Diseases?
Endometriosis Foundation of America’s Patient Awareness, New York, NY

2018 Lecture Introduction to Epidemiology and Public Health
Brookline High School Medical Club, Brookline, MA

Report of Scholarship

Peer reviewed publications in print or other media
* Indicates equal contribution


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**Peer reviewed publications in print or other media**

**Commentary**


**Thesis**

“A Prospective Study of Endometriosis and Breast Health: Findings from the Nurses’ Health Study II” March 1, 2016 Harvard T.H. Chan School of Public Health. Advisor: Stacey A Missmer, ScD
Jin Zhou

Contact Information
1295 N. Martin Ave. A242
P.O. Box 245211
Tucson, AZ 85724
Phone: 520-626-1393
Fax: 520-626-2767
jzhou@email.arizona.edu

Education
School of Mathematics and Computer Science, Nanjing Normal University, China

BA Mathematics
1998 - 2002

Institute of Mathematics, Nankai University, China

MS Applied Mathematics
2002 - 2005

Department of Biomathematics, University of California, Los Angeles

PhD Biomathematics
2005 - 2010

- Advisors: Kenneth Lange PhD and Janet Sinsheimer PhD

Employment
Research Assistant
2007 - 2010

Departments of Biomathematics and Human Genetics
University of California, Los Angeles, CA

Research Assistant
2008 - 2009

Semel Institute for Neuroscience and Human Behavior
University of California, Los Angeles, CA

Research Fellow
2011 - 2013

Department of Biostatistics
Harvard University, Boston, MA

Channing’s Laboratory
Brigham and Women’s Hospital
Harvard Medical School, Boston, MA
Advisor: Nan Laird PhD

Assistant Professor
2013 - Present

Department of Epidemiology and Biostatistics
Mel and Enid Zuckerman College of Public Health
University of Arizona, Tucson, AZ

Faculty
2013 - Present

Statistics Graduate Interdisciplinary Program
University of Arizona, Tucson, AZ

Faculty
2014 - Present

Genetics Graduate Interdisciplinary Program
University of Arizona, Tucson, AZ

Research Principal Investigator
2015 - Present

Phoenix VA Health Care System
Phoenix, AZ
Honors and Awards

Dissertation Year Fellowship
University of California, Los Angeles
University of California

Travel Award and Stellar Abstract Award
Program in Quantitative Genomics, Harvard University

Travel Award
14th Meeting of New Researchers in Statistics and Probability, University of California San Diego

New Investigator Award
2016 SRCOS Summer Research Conference

Publications

Peer Review Journal

2005


2006


2009


2010


2011


2012


2013


2014


2015


2016


2017


2018


2019

37. J. J. Zhou, J. Koska, G. Bahn, and P. Reaven, Glycemic variation is a predictor of all-cause mortality in the veteran’s affairs diabetes trial, *Diabetes & Vascular Disease Research*. Accepted


Peer Review Conference Proceedings


Submitted Journal Publications


*Trainee; §Joint first author
### Software

1. **VCSelection.jl**  
   [https://github.com/JingZhai63/VCSelection](https://github.com/JingZhai63/VCSelection)

2. **PhylogeneticDistance.jl**  
   [https://github.com/JingZhai63/PhylogeneticDistance.jl](https://github.com/JingZhai63/PhylogeneticDistance.jl)

3. **ExactVC**  
   [https://github.com/jinjinzhou/VarianceComponentTest.jl](https://github.com/jinjinzhou/VarianceComponentTest.jl)

### Work in Progress

1. Genetic association analysis for T2D EHR phenotyping with application to million veteran program
2. Algorithms for individualized treatment decision for T2D, balancing effectiveness and adverse events
3. Optimal T2D treatment sequences for veterans

### Grant

#### Active

1. **Arizona Biomedical Research Commission (ABRC) New Investigator Award (Zhou)**  
   - Arizona Department of Health Services (ADHS)  
   - 03/01/2017-2/29/2020  
   - Develop Data-Driven Precision T2D Treatment Regime using Veteran Healthcare Database  
   - Role: Principal Investigator  
   - Total amount (% effort): $225,000 (10%)

2. **K01PAR-14-266 (Zhou)**  
   - NIH/NIDDK  
   - 08/01/2016 - 06/30/2020  
   - Develop T2D Patient-Centered Treatment Suggestion Rule using EMR data  
   - Role: Principal Investigator  
   - Total amount (% effort): $570,800 (75%)

4. **DHS-14-GPD-044-000-98 (Burgess)**  
   - Federal Emergency Management Agency  
   - 07/01/2016 - 06/30/2019  
   - Firefighter Cancer Prevention Study  
   - Role: Co-Investigator  
   - Total amount (% effort): $1,500,000 (10%)

5. **EMW-2015-FP-00213 (Burgess)**  
   - Federal Emergency Management Agency  
   - 07/20/2016 - 7/19/2019  
   - Firefighter Prospective Cohort Framework Study  
   - Total amount (% effort): $1,500,000 (10%)

6. **U01AI122275 (Galgiani)**  
   - NIAID  
   - 12/01/2016-11/31/2020  
   - Immuno-Genetic Basis for Human Disseminated Coccidioidomycosis  
   - Role: Other significant contributor  
   - Total amount (% effort): $575,884 (5% Year 1)

7. **R01HL136528-01A1 (Klimentidis)**  
   - NHLBI  
   - 04/01/2018-01/31/2021  
   - Genetics at the Interface of Lipid and Glycemic Traits  
   - Role: Co-Investigator
Total amount (% effort): $1,059,049 (10%)

Pending

1. R01
   • NHGRI 09/01/2018-08/31/2023
   • OpenMendel and Julia: Algorithms and Software for Modern Genomic Data Analysis
   • Role: Site Principal Investigator

2. R01
   • NHLBI 07/01/2018-06/30/2023
   • Genetics of Response to Exercise in Arizona Teens
   • Role: Co-Investigator

Completed

1. 0016570-1 (Kent Kwoh)
   • University of Pittsburgh 07/01/2013 - 9/30/2015
   • Pivotal Osteoarthritis MRI Analysis (POMA)
   • Role: Biostatistician
   • % effort 20.2%

2. P30CA023074 (Arizona Cancer Center Support Grant)
   • NIH/NCI 08/19/2009 - 06/30/2016
   • Role: Biometrics Share Resource Co-Investigator
   • % effort: 6.3%

3. R21CA178324 (Andrew Kraft)
   • NCI 06/01/2015 - 5/31/2017
   • Role: Biostatistician
   • Pim 1 Protein Kinase in Regulating Stromal Cell Biology in Prostate Cancer
   • % effort: 2%

4. R01AR066601 (Kent Kwoh)
   • NIAMSD 07/01/2014 - 7/31/2018
   • Risk of Incident Knee OA and Clinical Outcomes Based on Imaging Biomarkers
   • Role: Biostatistician
   • % effort: 12%

5. R21CA173200 (Andrew Kraft)
   • NCI 06/05/2014 - 7/31/2018
   • Role: Co-Investigator
   • Targeting the Pim 1 Protein Kinase to Overcome Resistance to AKT Inhibitors
   • % effort: 2.5%
EDUCATION

Ph.D. in Statistics, 2013 - 2018
University of Georgia, USA

M.S. in Statistics, 2010 - 2013
Central University of Finance and Economics, Beijing, China

B.S. in Statistics, 2006 - 2010
Central University of Finance and Economics, Beijing, China

WORK EXPERIENCE

Visiting Assistant Professor, Aug 2018 - Present
Department of Mathematics, University of Arizona

RESEARCH INTEREST

Big data analytics, statistical learning in high dimensional data, multiple sources data integration, low-rank approximation, large-scale optimization, metabolomics, and bioinformatics.

PUBLICATIONS & MANUSCRIPTS

Manuscripts


· Zhong, W., Liu, Y., and Zeng, P. (2019). WLS: a model-free variable screening method based on leverage score. To be submitted. [PDF]


Publications


PRESENTATIONS

Domestic
- International Conference on Big Data and Information Analytics, Houston, TX. Session organizer and invited speaker. Dec 2018
- Department of Epidemiology and Biostatistics, University of Arizona. Seminar speaker. Sep 2018
- Georgia Informatics Symposium, Athens, GA. Poster session. Oct 2016
- Society of Neuroscience, Chicago, IL. Poster session. Oct 2015

International
- Department of Statistics, Central University of Finance and Economics, Beijing, China. Invited speaker. Dec 2016
- Institute of Statistics, Nankai University, Tianjin, China. Invited speaker.

AWARDS & HONORS

Best poster award, Georgia Statistics Day. Nov 2015
Research development committee travel funding, University of Georgia. 2014, 2015

RESEARCH & COLLABORATION EXPERIENCE

Leung Laboratory
Department of Biological Sciences, Purdue University 2014-2017

Schmitz Laboratory
Department of Genetics, University of Georgia 2015

Edison Laboratory
Complex Carbohydrate Research Center, University of Georgia 2016-2017

TEACHING EXPERIENCE

Instructor
Department of Mathematics, University of Arizona 2018 - present
· MATH 464 Theory of Probability Spring 2019
- MATH 122B First Semester Calculus \hspace{1cm} Fall 2018
- MATH 122A Functions for Calculus \hspace{1cm} Fall 2018

**Teaching Assistant**
*Department of Statistics, University of Georgia* \hspace{1cm} 2013-2017
- MSIT 3000 Statistical Analysis for Business I \hspace{1cm} Fall 2013
- STAT 6210 Introduction to Statistical Methods I \hspace{1cm} Spring 2014
- STAT 6315 Statistical Methods for Researchers \hspace{1cm} Fall 2015
- STAT 6800 Tools for Statistical Theory \hspace{1cm} Fall 2014
- STAT 8700 Stochastic Process \hspace{1cm} Spring 2015, Spring 2016
- STAT 8620 Categorical Data Analysis and Generalized Linear Models \hspace{1cm} Fall 2016, Fall 2017
- STAT 8630 Mixed-Effect Models and Longitudinal Data Analysis \hspace{1cm} Spring 2017

**PROFESSIONAL SERVICES**

**Referee Services**
- *Journal of the American Statistical Association (1)*
- *Statistica Sinica (1)*,
- *IEEE/ACM Transactions on Computational Biology and Bioinformatics (1)*,
- *Statistical Applications in Genetics and Molecular Biology (1)*,
- *Technometrics (1)*,
- *Biometrics (3)*,
- *Proceedings of the National Academy of Sciences (2)*.

**Member**

**Outreach Services**
- Served as a judge for *Georgia Science and Engineering Fair*. \hspace{1cm} Apr 2014
- Served as a speaker for *Speaker Series* at The Gwinnett School of Mathematics, Science, and Technology. \hspace{1cm} Nov 2017
Curriculum Vitae
Dr. Chiu-Hsieh (Paul) Hsu

Contact Information
Mel and Enid Zuckerman College of Public Health
University of Arizona
1295 N Martin Ave.
Drachman Hall A232
Tucson, AZ 85724

pchhsu@email.arizona.edu
(520) 626-5054

EDUCATION
1997 M.S. in Statistics, National Tsing Hua University, Hsinchu, Taiwan

2000 M.S. in Biostatistics, School of Public Health, University of Michigan, Ann Arbor


EMPLOYMENT AND APPOINTMENTS
1996-1998 Research & Teaching Assistant, Department of Statistics, National Tsing Hua University, HsinChu, Taiwan

1998-1999 Teaching Assistant, Biostatistics Department, University of Michigan, Ann Arbor

1999-2003 Research Assistant, Biostatistics Department, University of Michigan, Ann Arbor

2003-2005 Assistant Professor (NTE), Mel and Enid Zuckerman College of Public Health (MEZCOPH), University of Arizona, Tucson, Arizona

2005-2011 Assistant Professor (TE), Mel and Enid Zuckerman College of Public Health (MEZCOPH), University of Arizona, Tucson, Arizona

2011- Associate Professor, Mel and Enid Zuckerman College of Public Health (MEZCOPH), University of Arizona, Tucson, Arizona

2013- Assistant Director for Biostatistics, Phase I & II Consortium, University of Arizona Cancer Center

2014-2016 Biostatistician, College of Nursing, University of Arizona

2018- Biostatistician, Department of Surgery, University of Arizona
**HONORS AND AWARDS**

- 1996: Scholarship of the Outstanding First-Year Master Student, Ministry of Education, Taiwan
- 1999: Travel Grant to the NSF/CBMS Regional Conference (Houghton, MI) in Statistics Inference in Genetic Data, National Science Foundation
- 2000: Award for Best Performance in Ph.D. Qualifying Examination, Department of Biostatistics, University of Michigan
- 2002: Travel Grant, Rackham Graduate School, University of Michigan, Ann Arbor
- 2002: Travel Award to the 17th International Workshop on Statistical Modelling, Crete, Greece
- 2003: One-Term Dissertation Fellowship, Rackham Graduate School, University of Michigan, Ann Arbor
- 2004: Distinguished Student Paper Award, International Biometric Society (Eastern North American Region)
- 2004: Travel Grant to the 22nd International Biometric Conference (Cairns, Australia), International Affairs Office, University of Arizona, Tucson
- 2005: Travel Grant to the 8th North American Meeting of New Researchers in Statistics and Probability, Minneapolis, Minnesota
- 2006: Travel Grant to International Workshop on Statistical Modelling (Galway, Ireland), International Affairs Office, University of Arizona, Tucson
- 2007: Travel Grant to International Workshop on Statistical Modelling (Barcelona, Spain), International Affairs Office, University of Arizona, Tucson
- 2008: Travel Grant to American Association for Cancer Research Cancer Biostatistics Workshop, Sonoma, CA
- 2012: Visiting Scholar, Genetic Epidemiology, International Agency for Research on Cancers, Lyon, France.
- 2016: Elected member, International Statistical Institute

**PROFESSIONAL AFFILIATIONS/MEMBERSHIPS**

- 2003-: Member, American Statistical Association
- 2007-: Member, U of AZ Statistics Graduate Interdisciplinary Program (GIDP)
- 2010-: Comprehensive Member, University of Arizona Cancer Center (UACC)
- 2010-: Member, Statistical Modelling Society
- 2011-: Statistician, International Cardiac Arrest Registry (Etiology)

**RESEARCH**

*Research Area*

- Missing data
- Survival analysis
- Early phase clinical trials
- Statistical modelling for colorectal polyp prevention data

*Peer reviewed journal articles*

References with * indicate work with a graduate student supervisee. References with # indicate work while I was a graduate student.


Shikhar Kumar
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Employment

**Statistician, University of Arizona Health Sciences, The University of Arizona** (January, 2017 - current)
- Principal Bio-Statistician for the National Institute of Health (NIH) funded H3Africa (Human Heredity and Health in Africa) Kidney Disease Network
- Contributed towards the development of grant applications
- Contributed towards scientific reports and manuscripts for publication

**Lecturer, Department of Epidemiology and Biostatistics, Mel and Enid Zuckerman College of Public Health, The University of Arizona** (July, 2016 - current)
- Teach graduate and undergraduate courses in Biostatistics
- Served on departmental admission committee for the incoming masters and Ph.D. students
- Served on the committee for designing undergraduate Data Science minor for the College of Public Health

**Visiting Assistant Professor, School of Information, The University of Arizona** (August, 2014 - June, 2016)
- Taught undergraduate courses in data science, statistics and research methods
- Designed, developed and taught new data science courses for the School of Information, including “Dealing with Data” and “Agent-based Modeling”
- Advised undergraduate students on their Capstone Projects
- Served on the committee in the transition of the School of Information from the College of Science to the College of Social and Behavioral Sciences

**Postdoctoral Research Associate, School of Government and Public Policy, The University of Arizona** (October, 2013 - August, 2014)
- Led the agent-based modeling effort for determining socio-economic drivers of residential solar energy adoption for a Department of Energy (DOE) funded project
- Collaborated with co-investigators across different institutions, including scientists at National Renewable Energy Laboratory (NREL) on the development of the agent-based models

**Postdoctoral Fellow, Dynamic Decision Making Laboratory, Department of Social and Decision Sciences, Carnegie Mellon University** (October, 2012 - September, 2013)
- Led the computational modeling effort for a project funded by the Army Research Laboratories (ARL)
- Designed and implemented experiments to understand cognitive underpinning of relational reasoning
- Published empirical scientific research in academic journals and conferences

**Software Engineer, Accenture India Delivery Center, Bangalore, India** (June, 2006 - July, 2007)
- Served on the software quality control and testing team for a mainframe-based claims processing system contracted by the United Health Group
- Conducted systems level testing of new modules before deployment

Education

**Ph.D., Psychology (major) and Cognitive Science (Minor), The University of Arizona, Tucson AZ** (August 2012)
**Advisor:** Lynn Nadel, Ph.D.

**M.A., Psychology, The University of Arizona, Tucson AZ** (2009)
**Advisor:** Michael J. Frank, Ph.D.


Technical Skills

**Python, R, SAS, STATA, MATLAB, Mathematica, Netlogo, C, C++, SQL, Linux**

Additional Information

**Interests:** Armature astronomy/astrophysics, Large format photography, Large format image processing and printing using digital darkroom, Writing, Travel