THE UNIVERSITY OF ARIZONA

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

DEPTMNT ID	DEPARTMENT NAME	HOST
4204	Epidemiology and Biostatistics	Y

Campus(es):

MAIN

LOCATION	DESCRIPTION
TUCSON	Tucson

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.

Program Length Type: Program Length Value: 0.00

Report as NSC Program:

SULA Special Program:

Print Option:

Diploma: Y Population Health Data Science minor

Transcript: Y Population Health Data Science minor

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

NBR	PROGRAM	DEGREE	#STDNTS	LOCATION	ACCRDT

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:

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

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

DEPARTMENT	UGRD HEAD COUNT	GRAD HEAD COUNT	FACULTY FTE
4204	0	92	19.80

Projected Student & Faculty FTE

	UGRD HEAD COUNT			GRAD HEAD COUNT			FACULTY FTE		
DEPT	YR 1	YR 2	YR 3	YR 1	YR 2	YR 3	YR 1	YR 2	YR 3
4204	0	0	0	92	92	92	19.00	19.00	19.00

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

Comments
LOS to be finalized.

3/17/2019 12:56 PM

KERNST

Comments
Done.

5/15/2019 1:24 PM

PCHHSU

Comments
Approved.

7/16/2019 8:32 AM

MARTINMARQUEZ

Comments
Added comparison summary provided by KERNST to Program Comparisons -Peer Comparison field.

THE UNIVERSITY OF ARIZONA

NEW ACADEMIC PROGRAM-STANDALONE UNDERGRADUATE MINOR
ADDITIONAL INFORMATION FORM

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.

Total units required to complete minor	18
Upper-division units required	18
Total transfer units that may apply to minor	0
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.
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.	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)
Internship, practicum, applied course requirements (Yes/No. If yes, provide description)	BIOS: 453 (NEW): Health Data Science Practice (3)
Additional requirements (provide description)	None
Any double-dipping restrictions? (Yes/No. If yes, provide description)	Yes. Public health majors cannot also be in the Population Health Data Science Minor.

*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.

Course prefix and number (include cross-listings)	Units	Title	Course Description	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Typically Offered (F, W, Sp, Su)	Dept signed party to proposal? (Yes/No)
EPID 309	3	Introduction to Epidemiology	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	Math 112 or higher	In-person and online	F, Sp	Yes
BIOS 376	3	Introduction to Biostatistics	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.	Math 112 or higher	In-person, online	F, Sp	Yes

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.

Course prefix and number (include cross-listings)	Units	Title	Course Description	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Status*	Anticipated first term offered	Typically Offered (F, Sp, Su)	Dept signed party to proposal? (Yes/No)
EPID/BIOS 450	3	Health Data Acquisition and Assessment	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.	EPID 309 and BIOS 376. Junior and senior status.	In-person	Approved	Fall 2019	F	Yes
BIOS/EPID 451	3	Health Data Management and Visualization	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	In-person	Approved	Fall 2019	F	Yes

			applied projects to collect, access and work with existing health data.						
BIOS 452	3	Health Data Analysis and Communication Methods	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.	EPID 309 and BIOS 376	In-person	Approved	Spring 2020	Sp	Yes
EPID/ BIOS 453	3	Health Data Science Practice	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	The other 5 required courses	In-person	Approved	Fall 2020	F	Yes

			question and use the skills developed in the previous courses to assess and analyze public health data and communicate findings to the public.						

*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).

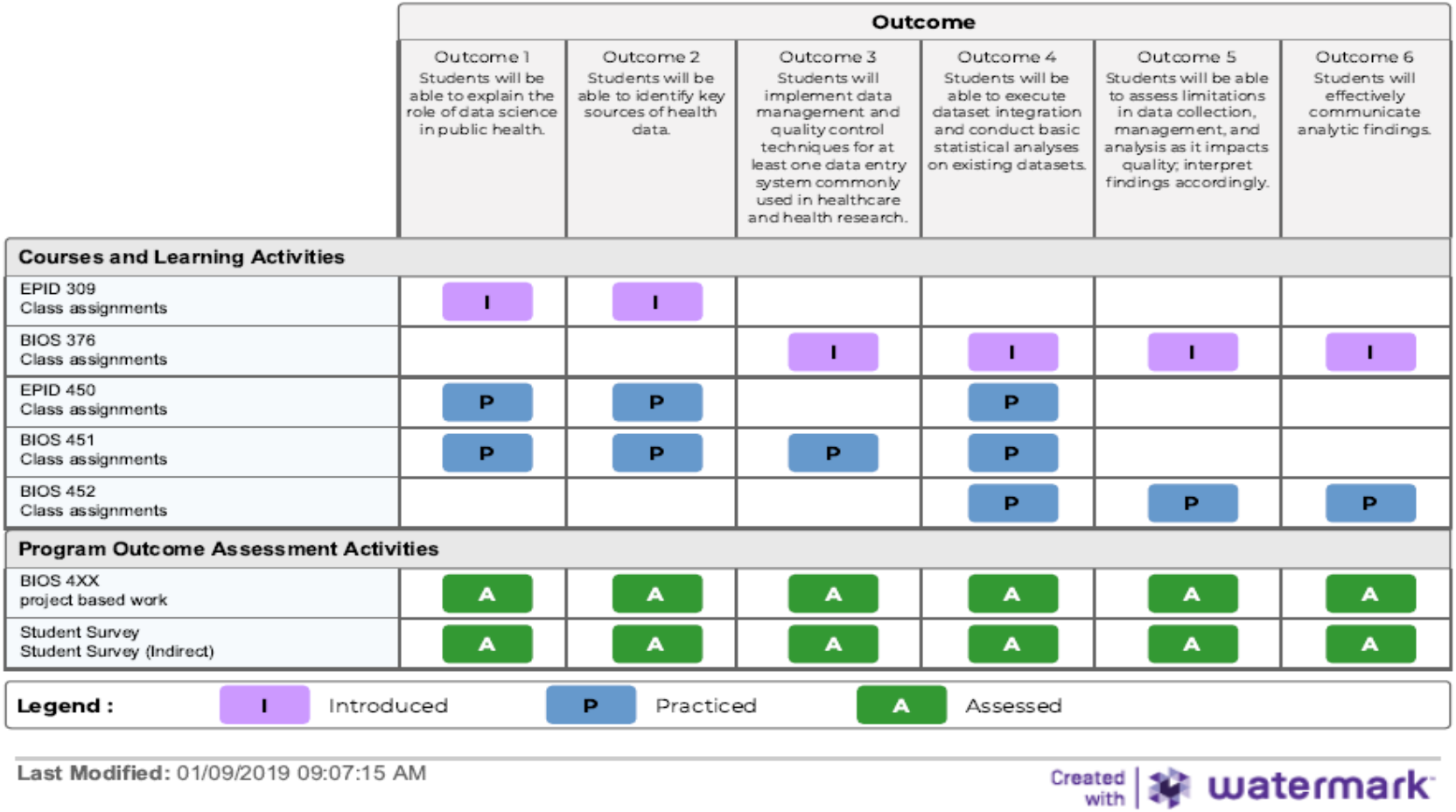
The competencies below and the Curriculum Map in Appendix B describe what students should know, understand, and be able to do at the conclusion of this minor.

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



	Outcome					
	Outcome 1 Students will be able to explain the role of data science in public health.	Outcome 2 Students will be able to identify key sources of health data.	Outcome 3 Students will implement data management and quality control techniques for at least one data entry system commonly used in healthcare and health research.	Outcome 4 Students will be able to execute dataset integration and conduct basic statistical analyses on existing datasets.	Outcome 5 Students will be able to assess limitations in data collection, management, and analysis as it impacts quality; interpret findings accordingly.	Outcome 6 Students will effectively communicate analytic findings.
Courses and Learning Activities						
EPID 309 Class assignments	I	I				
BIOS 376 Class assignments			I	I	I	I
EPID 450 Class assignments	P	P		P		
BIOS 451 Class assignments	P	P	P	P		
BIOS 452 Class assignments				P	P	P
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

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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.

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

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, 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" ". 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?

5-YEAR PROJECTED ANNUAL ENROLLMENT					
	1st Year	2nd Year	3rd Year	4th Year	5th Year
Number of minors	30	60	90	110	120

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:

Major	**Major Students_Fall 2017**	**Require Minor**
Math	479	yes - from a list of 4 minors
Econ	610	yes
Business Econ	113	no
Comp Sci	375	no
Bioinformatics	20	no
Information Science and eSociety	156	yes
Total	**1753**	
Total that require a minor	**1245**	

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?

PROJECTED MINORS AWARDED ANNUALLY					
	1st Year	2nd Year	3rd Year	4th Year	5th Year
Number of awarded minors	18	**36**	**44**	**66**	**72**

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.

Faculty Member	UA Vitae link or "CV attached"
Heidi Brown	CV attached
Zhao Chen	CV attached
Kacey Ernst	CV attached
Leslie Farland	CV attached
Chiu-Hsieh (Paul) Hsu	CV attached
Shikhar Kumar	CV attached
Xiaoxiao Sun	https://profiles.arizona.edu/person/xiaosun

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

BUDGET PROJECTION FORM

Name of Proposed Program or Unit: Minor, Population Health Data Science

	1st Year 2020 - 2021	Projected 2nd Year 2021 - 2022	3rd Year 2022 - 2023
METRICS			
Net increase in annual college enrollment UG	26	52	78
Net increase in college SCH UG	312	624	936
Net increase in annual college enrollment Grad			
Net increase in college SCH Grad			
Number of enrollments being charged a Program Fee			
New Sponsored Activity (MTDC)	n/a	n/a	n/a
Number of Faculty FTE (current & TBH)	1.01	1.01	1.01
FUNDING SOURCES			
Continuing Sources			
UG RCM Revenue (net of cost allocation)	40,950	81,900	122,850
Grad RCM Revenue (net of cost allocation)			
Program Fee RCM Revenue (net of cost allocation)			
F and A Revenues (net of cost allocations)	n/a	n/a	n/a
UA Online Revenues			
Distance Learning Revenues			
Reallocation from existing College funds (attach description)			
Other Items (attach description)			
Total Continuing	**$ 40,950**	**$ 81,900**	**$ 122,850**
One-time Sources			
College fund balances			
Institutional Strategic Investment			
Gift Funding			
Other Items (attach description)			
Total One-time	**$ -**	**$ -**	**$ -**
TOTAL SOURCES	**$ 40,950**	**$ 81,900**	**$ 122,850**
EXPENDITURE ITEMS			
Continuing Expenditures - additional support only			
Faculty TBH (1 X 1.0, .51 instr/.49 research)		48,450	48,450
Other Personnel			
Employee Related Expense (31.2%)	-	15,116	15,116
Graduate Assistantships sal & ere (2 X .25 FTE)	34,584	34,584	34,584
Other Graduate Aid (tuition remission)	11,716	11,716	11,716
Operations (materials, supplies, phones, etc.)	2,500	2,500	2,500
Additional Space Cost			
Other Items (attach description)			
Total Continuing	**$ 48,800**	**$ 112,366**	**$ 112,366**
One-time Expenditures			
Construction or Renovation			
Start-up Equipment			
Replace Equipment			
Library Resources			
Other Items (attach description)			
Total One-time	**$ -**	**$ -**	**$ -**
TOTAL EXPENDITURES	**$ 48,800**	**$ 112,366**	**$ 112,366**
Net Projected Fiscal Effect	**$ (7,850)**	**$ (30,466)**	**$ 10,484**

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

Minor name, institution	Proposed UA Program: Minor in Population Health Data Science and Communication	Peer 1: Minor in Applied Data Science, Case Western University	Peer 2: Minor in Data Science, Stanford
Current# of enrolled students		50	10
Minor program description	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.	From: https://case.edu/datascience/for-students/degree-programs/undergraduate-applied-data-science-minor The minor in Applied Data Science, which is administered in the Materials Science and Engineering Department, is to help bring the application of data science to a variety of fields, Case Western Reserve University has developed a unique Applied Data Science undergraduate minor that can be paired with any undergraduate major. The subject domain areas include Engineering and Physical Sciences; Health; Business.	From: https://statistics.stanford.edu/data-science-minor The Data Science minor, which is administrated by the Department of Statistics, has been designed for majors in the humanities and social sciences who want to gain practical know-how of statistical data analytic methods as it relates to their field of interest. The minor will provide students with the knowledge of exploratory and confirmatory data analyses of diverse data types (e.g. text, numbers, images, graphs, trees, binary input); strengthen social research by teaching students how to correctly apply data analysis tools and the techniques of data visualization to convey their conclusions. No previous programming or statistical background is assumed.
Target careers	Data analyst in the health sector	Unspecified. However, based on the domain areas it would include any type of careers that requires data analytical skills.	Unspecified. Only mention that it will broaden the career opportunity
Total units required to complete the minor	6 courses required with 18 credits	5 courses required with 15 credits	7 courses required with at least 22 credits
Upper -division units required	18	9	About 10
Total transfer units that may apply to minor	0	0	0

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.
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) BIOS 376: Introduction to Biostatistics (3) EPID 450: Health Data Acquisition, Assessment and Integration (3) BIOS 451: Health Data Management and Visualization (3) BIOS 452: Health Data Analysis (3) EPID 453: Health Data Science Practice (3)	Level 1: Data science programming (3) from one of the following 4 courses ENGR 131: Elementary Computer Programming EECS 132: Introduction to Programming in Java DSCI 133: Introduction to Data Science and Engineering for Majors DSCI 134: Introduction to Applied Data Science 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 & 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)

		DSCI 352: Applied Data Science Research SYBB 387: Undergraduate Research in Systems Biology	
Internship, practicum, applied course requirements (yes/no). If yes, provide description.	None	None	None
Additional requirements (provide description)	None	None	None

*Note: comparison of additional relevant programs may be requested.

THE UNIVERSITY OF ARIZONA
Eller College of Management

OFFICE OF THE DEAN

McClelland Hall 417
1130 E. Helen Street
P.O. Box 210108
Tucson, AZ 85721-0108
Ofc: 520-621-2125
eller.arizona.edu

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

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

THE UNIVERSITY OF ARIZONA
COLLEGE OF SCIENCE
Mathematics

617 N. Santa Rita Avenue
Tucson, Arizona 85721
www.math.arizona.edu

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 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.

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,

D L Ulmer

Douglas Ulmer
Professor and Head

Graduate Interdisciplinary Program in Statistics
Gould-Simpson 1005
P.O. Box 210077
1040 E. 4th Street
Tucson, AZ 85721-0240

(520) 621-0847
http://stat.bio5.org/

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

Joseph C. Watkins
Chair, Graduate Program in Statistics

THE UNIVERSITY OF ARIZONA
College of Science

College of Science
Office of the Dean

1040 E. Fourth Street
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T: (520) 621-4090
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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

THE UNIVERSITY OF ARIZONA
COLLEGE OF SOCIAL & BEHAVIORAL SCIENCES
School of Information

Harvill Building, 4th Floor
1103 E 2nd St.
Tucson, AZ 85721
520.621.3565
si.arizona.edu

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,

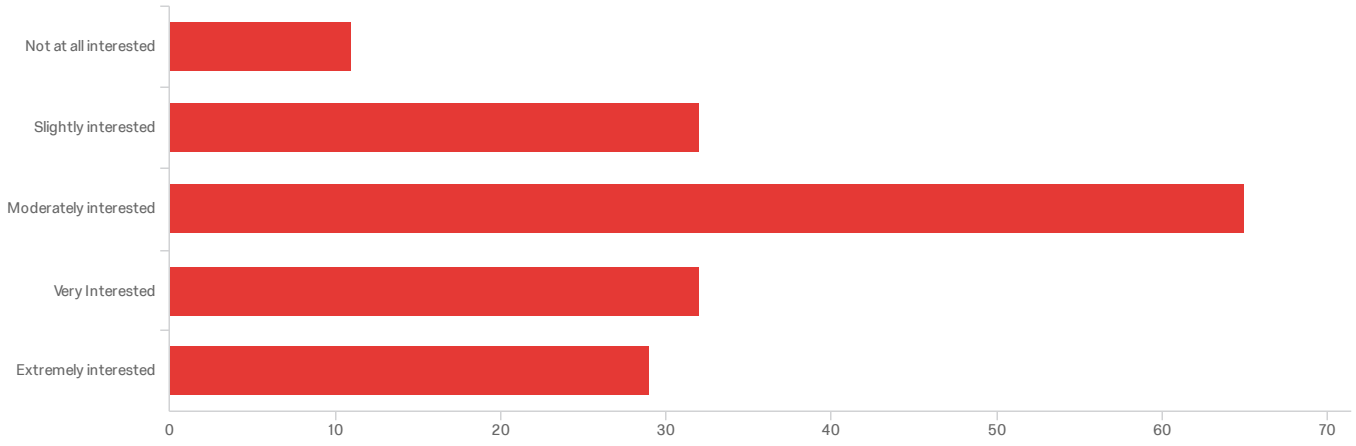
Catherine Brooks, Director
School of Information

Default Report

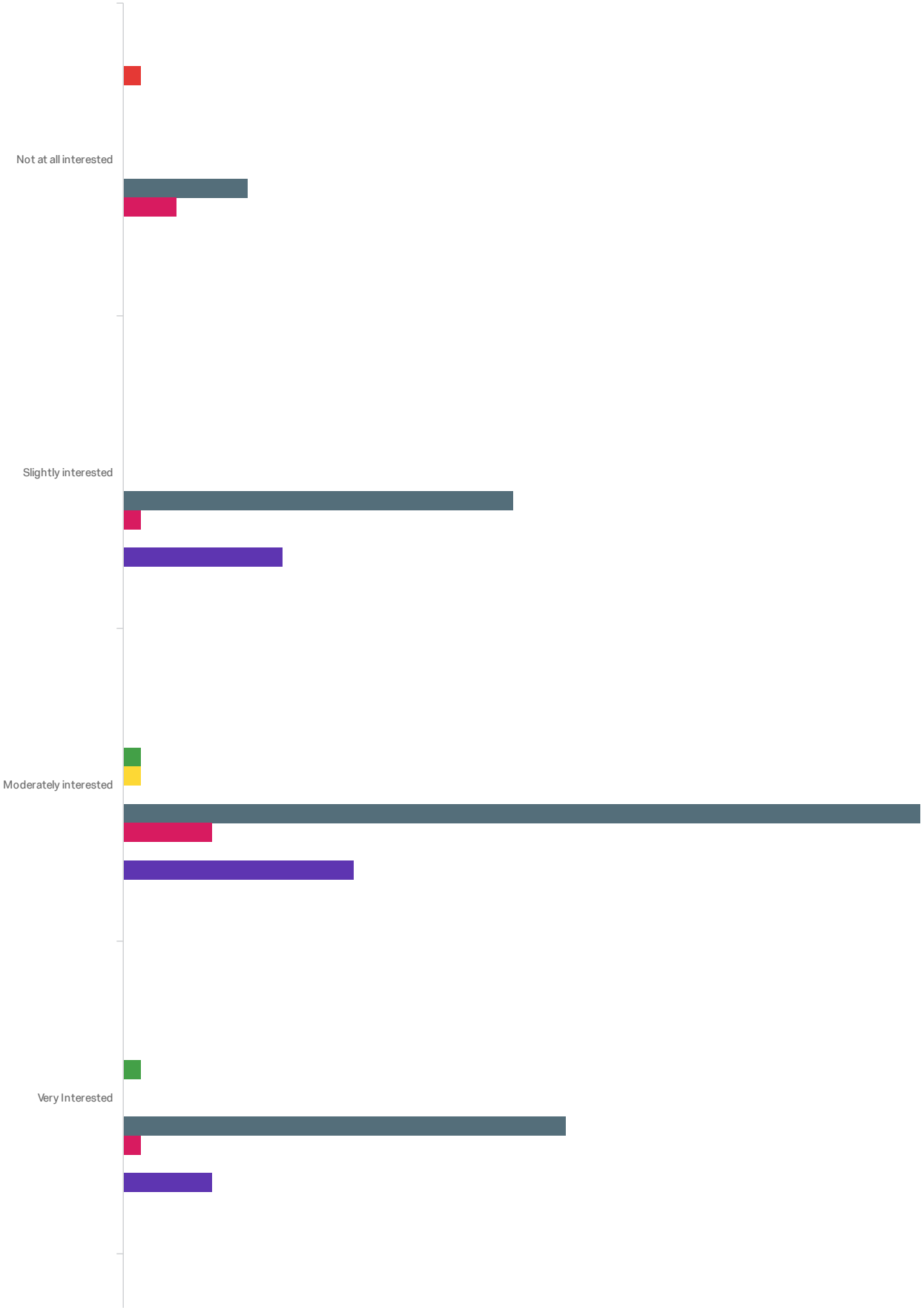
Undergraduate Minor Survey

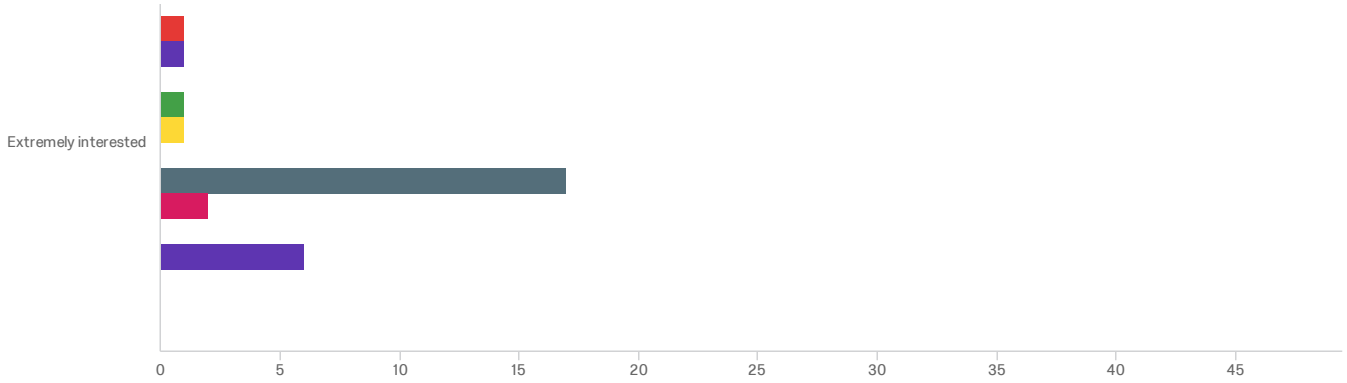
November 14, 2018 4:05 PM MST

New Custom Page



Q2 - What is your major?





#	Field	Not at all interested		Slightly interested		Moderately interested		Very Interested		Extremely interested	
1	Math	9.09%	1	0.00%	0	0.00%	0	0.00%	0	3.45%	1
2	Economics	0.00%	0	0.00%	0	0.00%	0	0.00%	0	3.45%	1
3	Business Economics	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0
4	Computer Science	0.00%	0	0.00%	0	1.54%	1	3.13%	1	3.45%	1
5	Bioinformatics	0.00%	0	0.00%	0	1.54%	1	0.00%	0	3.45%	1
6	Information Science and Society	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0
7	Public Health/Pre-Public Health	63.64%	7	68.75%	22	69.23%	45	78.13%	25	58.62%	17
8	Physiology	27.27%	3	3.13%	1	7.69%	5	3.13%	1	6.90%	2
9	Veterinary Sciences	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0
10	Other: (please specify)	0.00%	0	28.13%	9	20.00%	13	15.63%	5	20.69%	6
			11		32		65		32		29

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

Moderately interested

Other: (please specify)

Neuroscirnce & Cognitive Science

Molecular and Cellular Biology

Industrial Engineering

Hydrology

Biology

Biology

Biology

Biology

Bio

Anthropology

Anthropology

Anthropology

anthro

Very Interested

Other: (please specify)

Systems Engineering

Pre-business

Other: (please specify)

Neuroscience and Cognitive Science, Philosophy

Care Health and Society

Biology

Extremely interested

Other: (please specify)

Psychology

Psychology

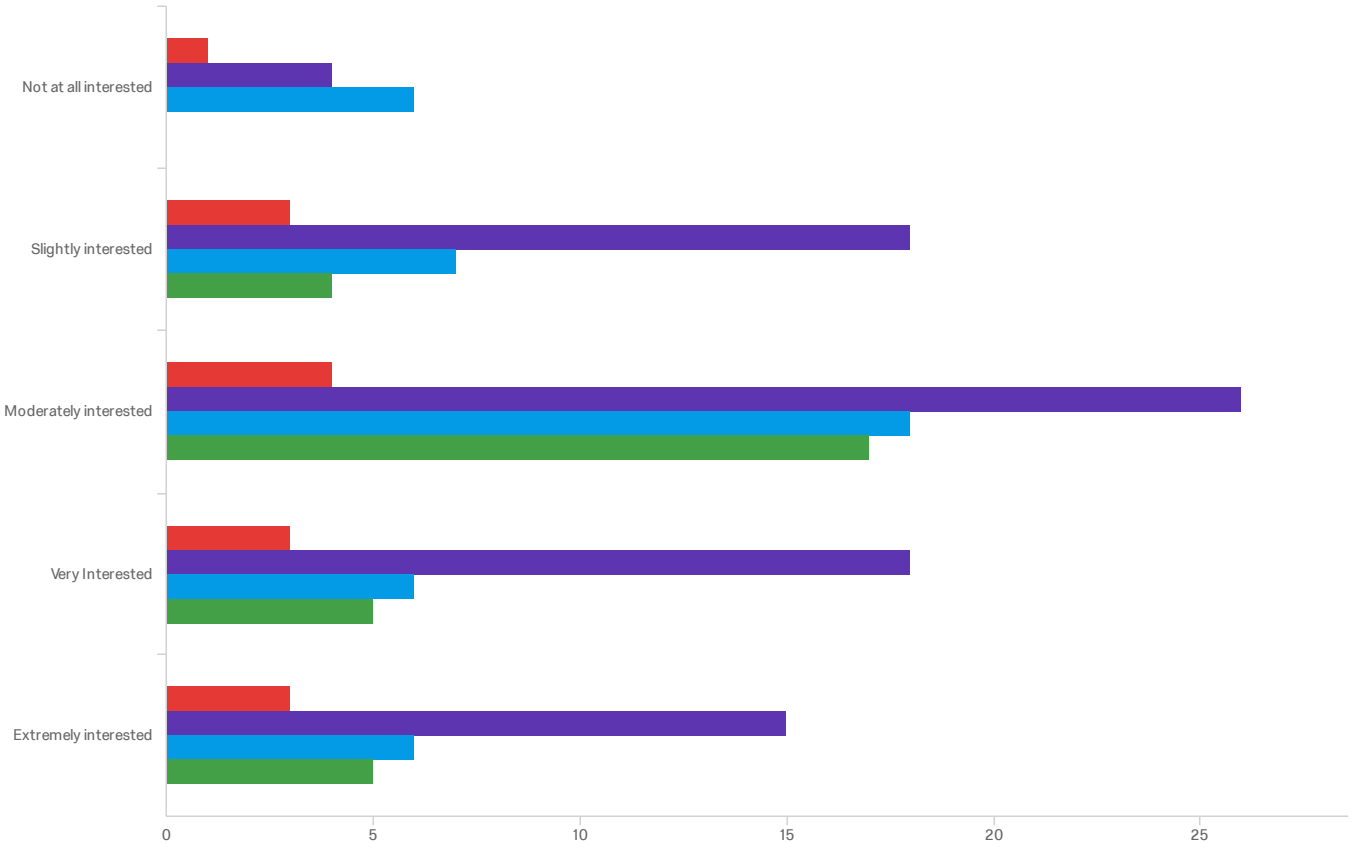
Neuroscience and Cognitive Science, Computer Science

Neuroscience

Natural Resouces

Ecology and evolutionary biology

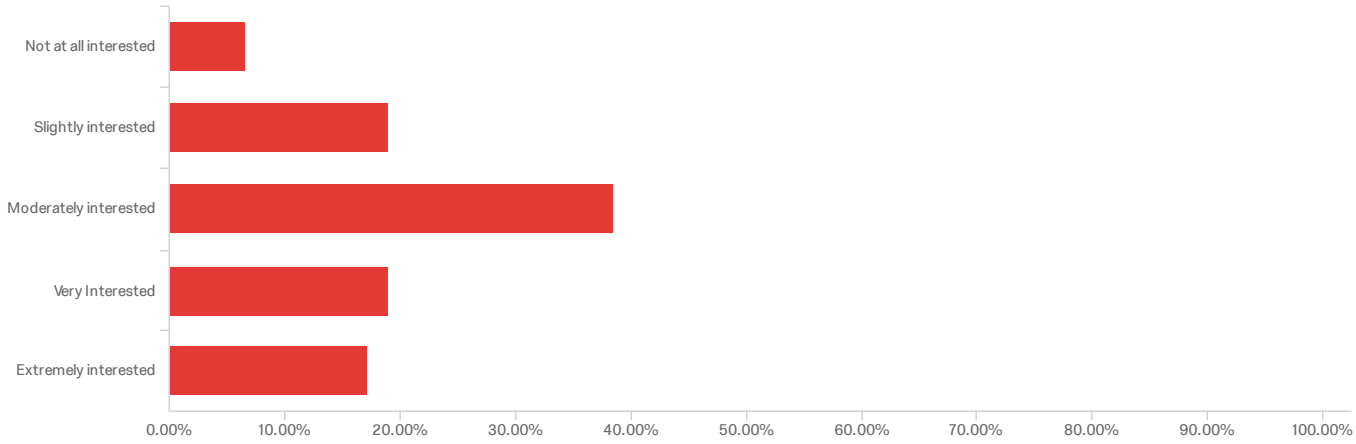
Q3 - Do you plan to take a minor?



#	Field	Not at all interested	Slightly interested	Moderately interested	Very Interested	Extremely interested	Total
1	Yes, required by my major.	7.14% 1	21.43% 3	28.57% 4	21.43% 3	21.43% 3	14
2	Yes, but it is not required	4.94% 4	22.22% 18	32.10% 26	22.22% 18	18.52% 15	81
3	No	13.95% 6	16.28% 7	41.86% 18	13.95% 6	13.95% 6	43
4	Unsure	0.00% 0	12.90% 4	54.84% 17	16.13% 5	16.13% 5	31

Showing rows 1 - 4 of 4

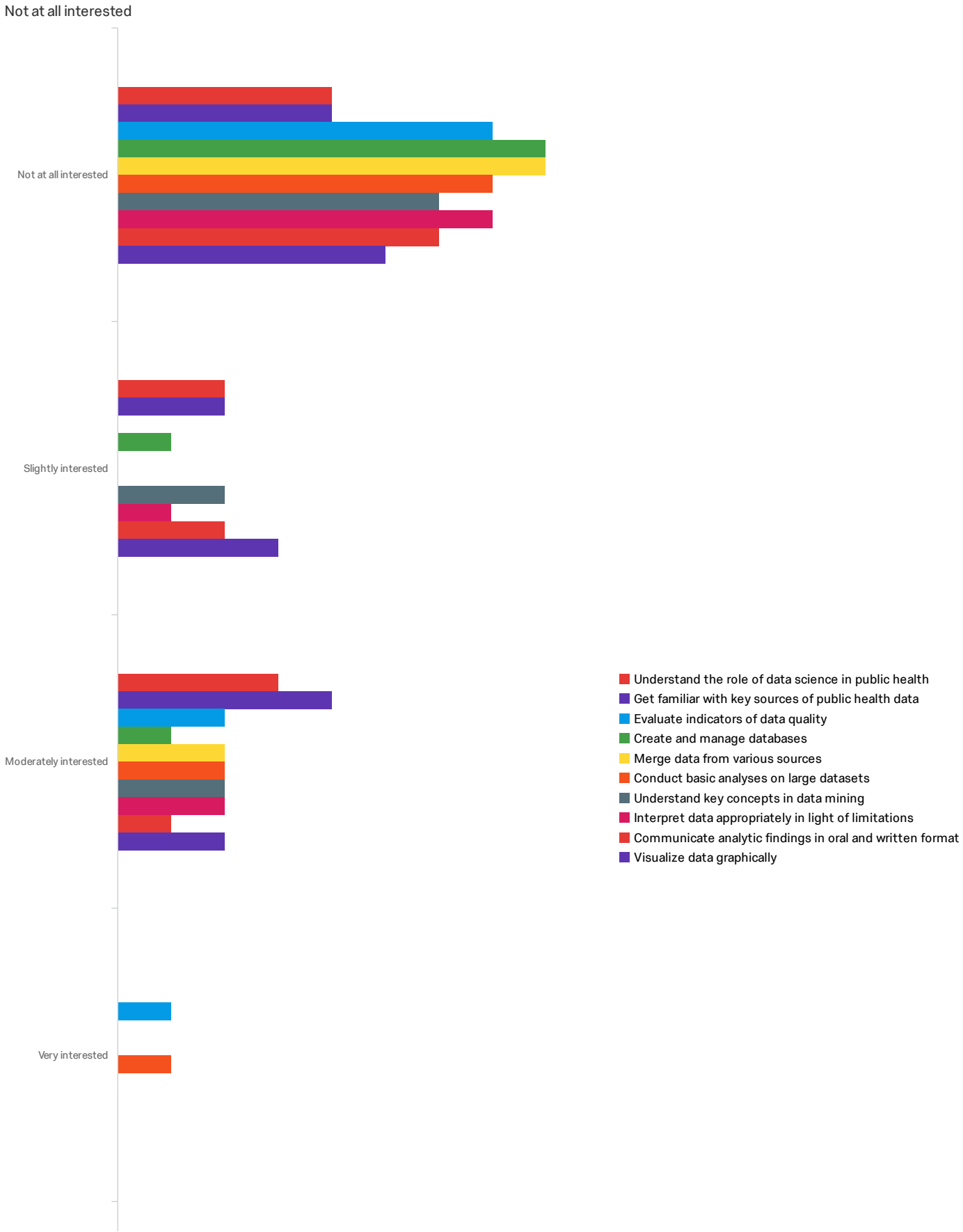
Q4 - The overall objectives of the proposed minor are: Be able to talk to a data scientist to develop collaborations in health research Obtain some basic data analysis skills Introduce concepts related to data science and opportunities for further training at a graduate level in the health sciences Communicate results effectively to community and decision-makers What is your level of interest in a minor that would pursue these objectives?

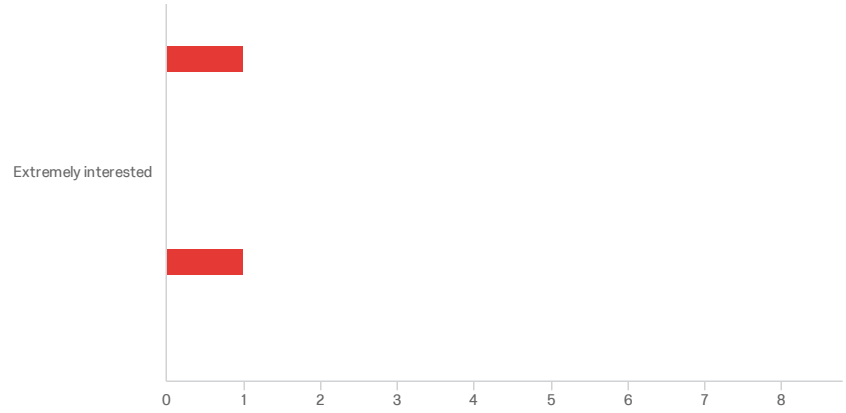


#	Field	Choice Count	
1	Not at all interested	6.51%	11
2	Slightly interested	18.93%	32
3	Moderately interested	38.46%	65
4	Very Interested	18.93%	32
5	Extremely interested	17.16%	29
			169

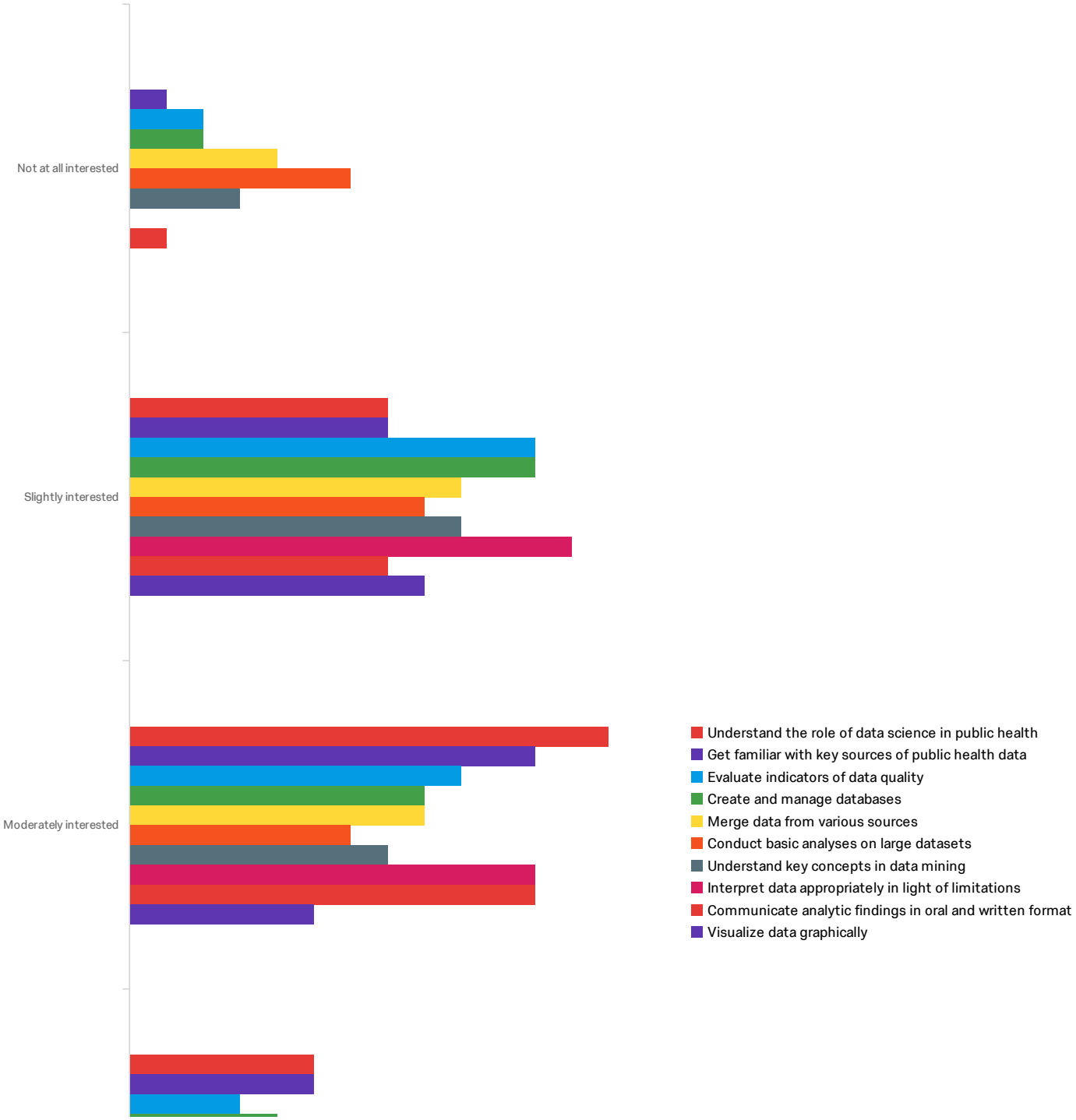
Showing rows 1 - 6 of 6

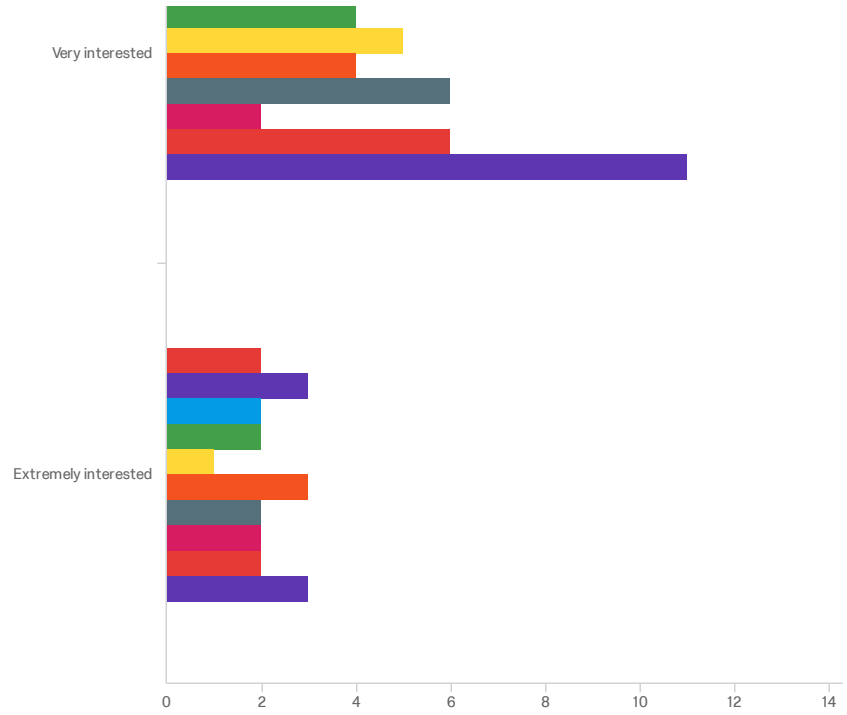
Q5 - Rank your level of interest in acquiring the following skills.



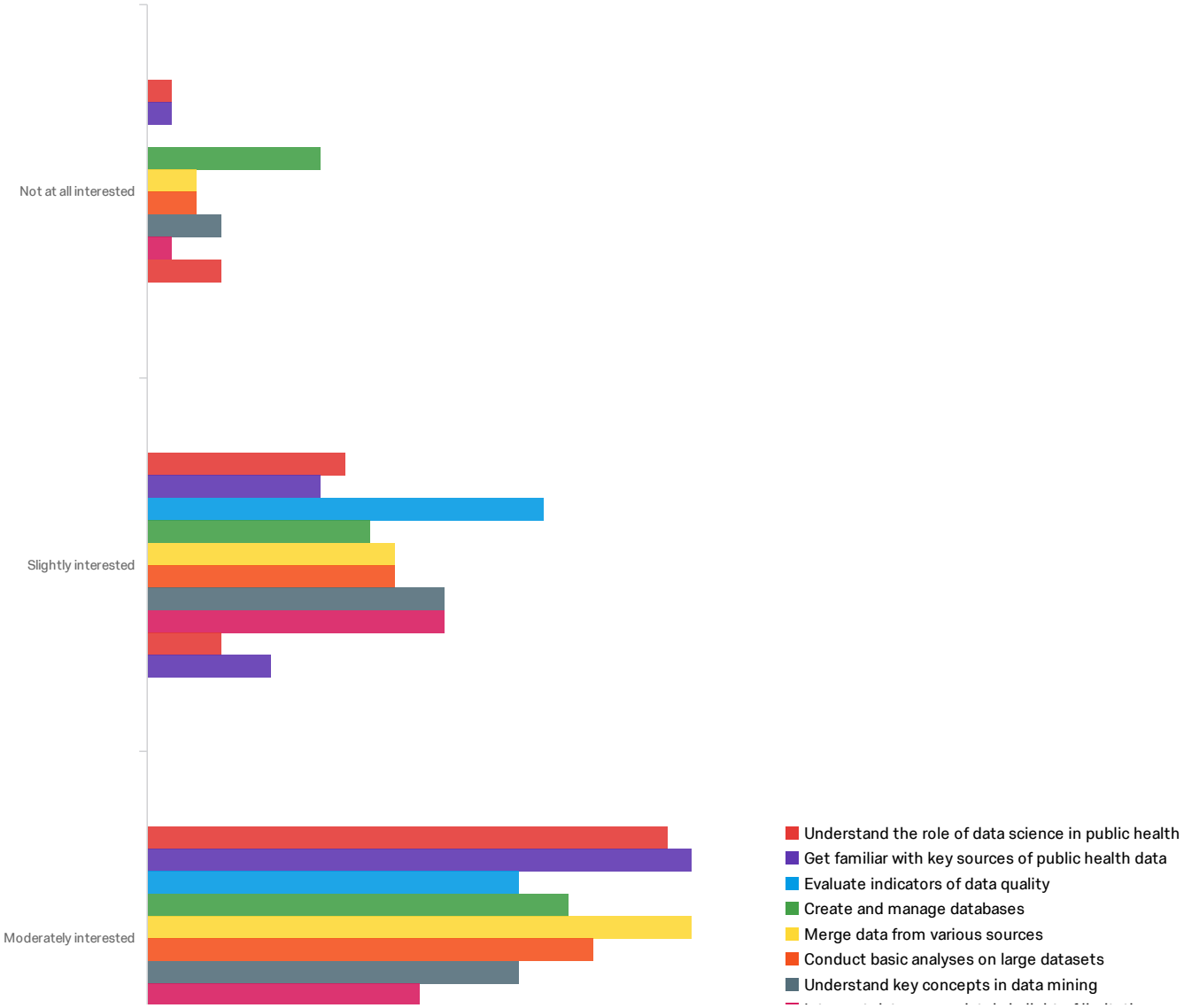


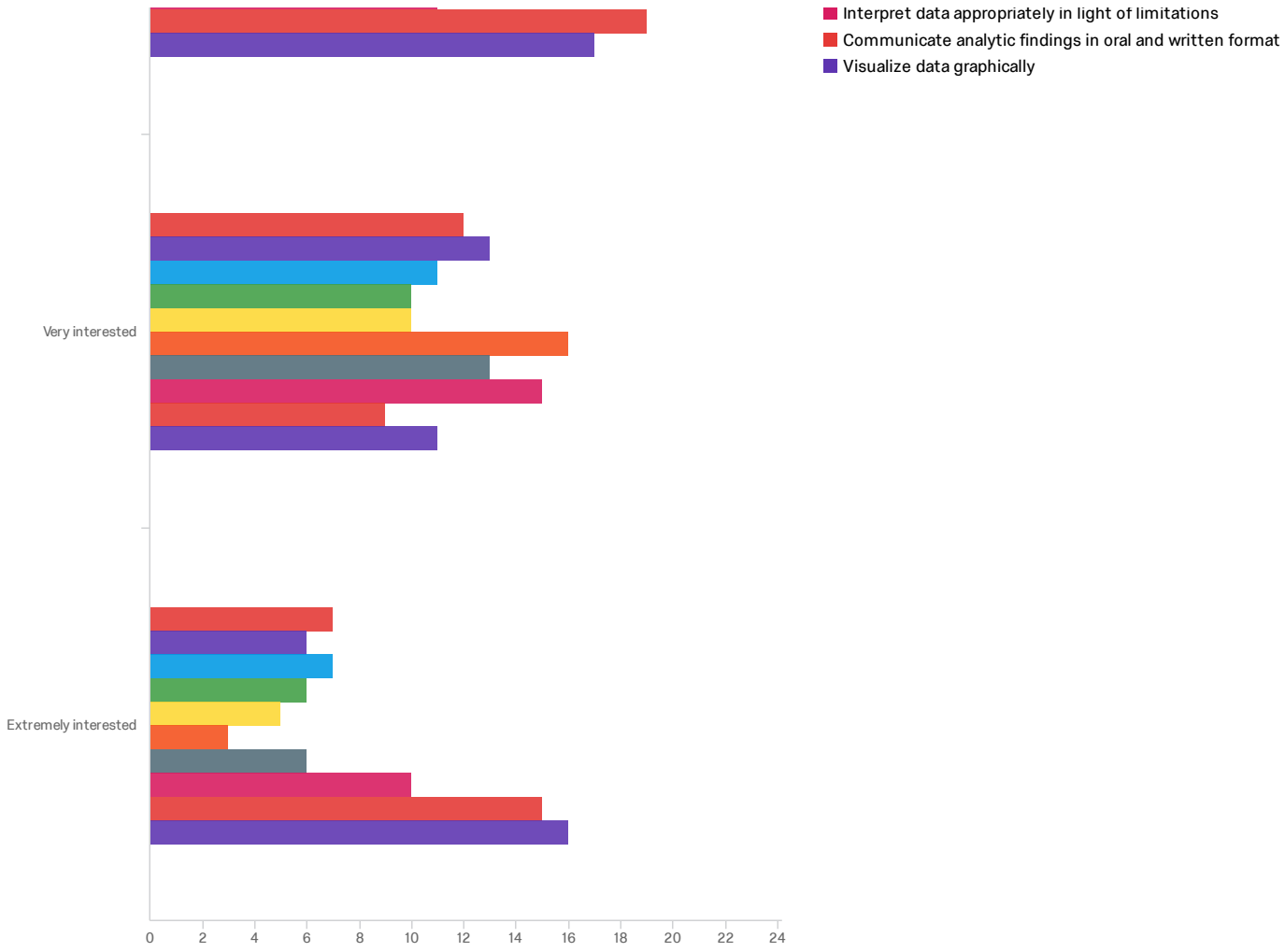
Slightly interested



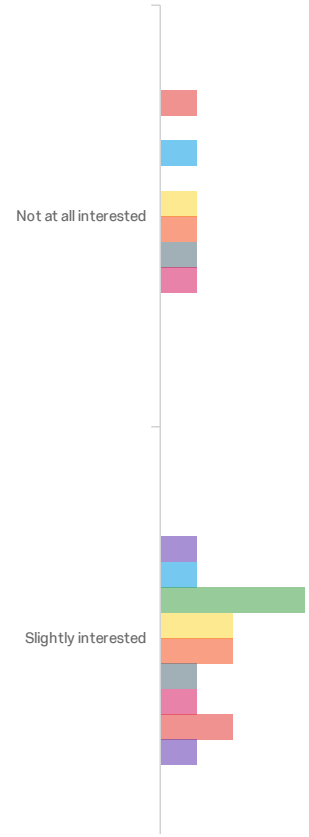


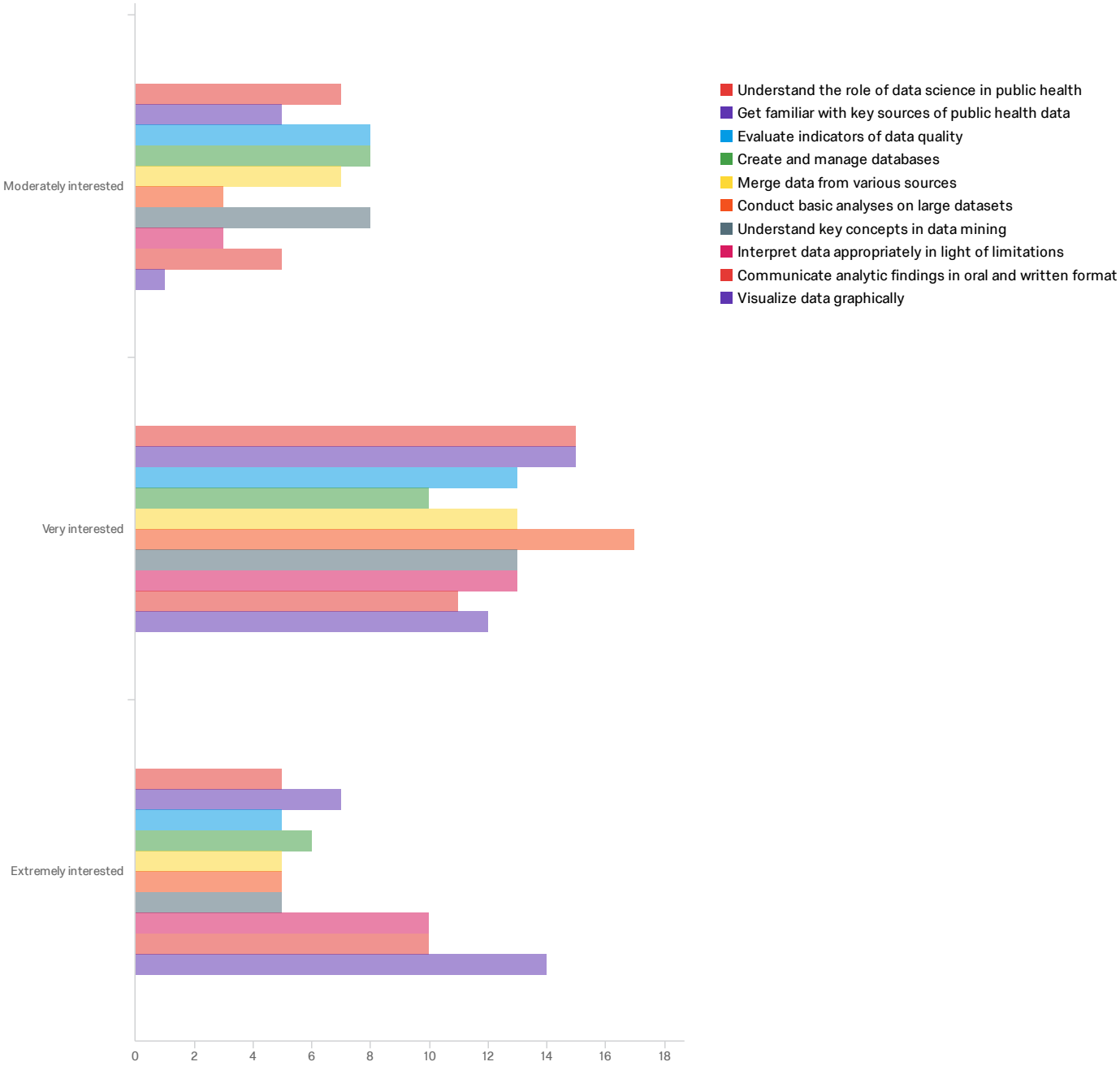
Moderately interested



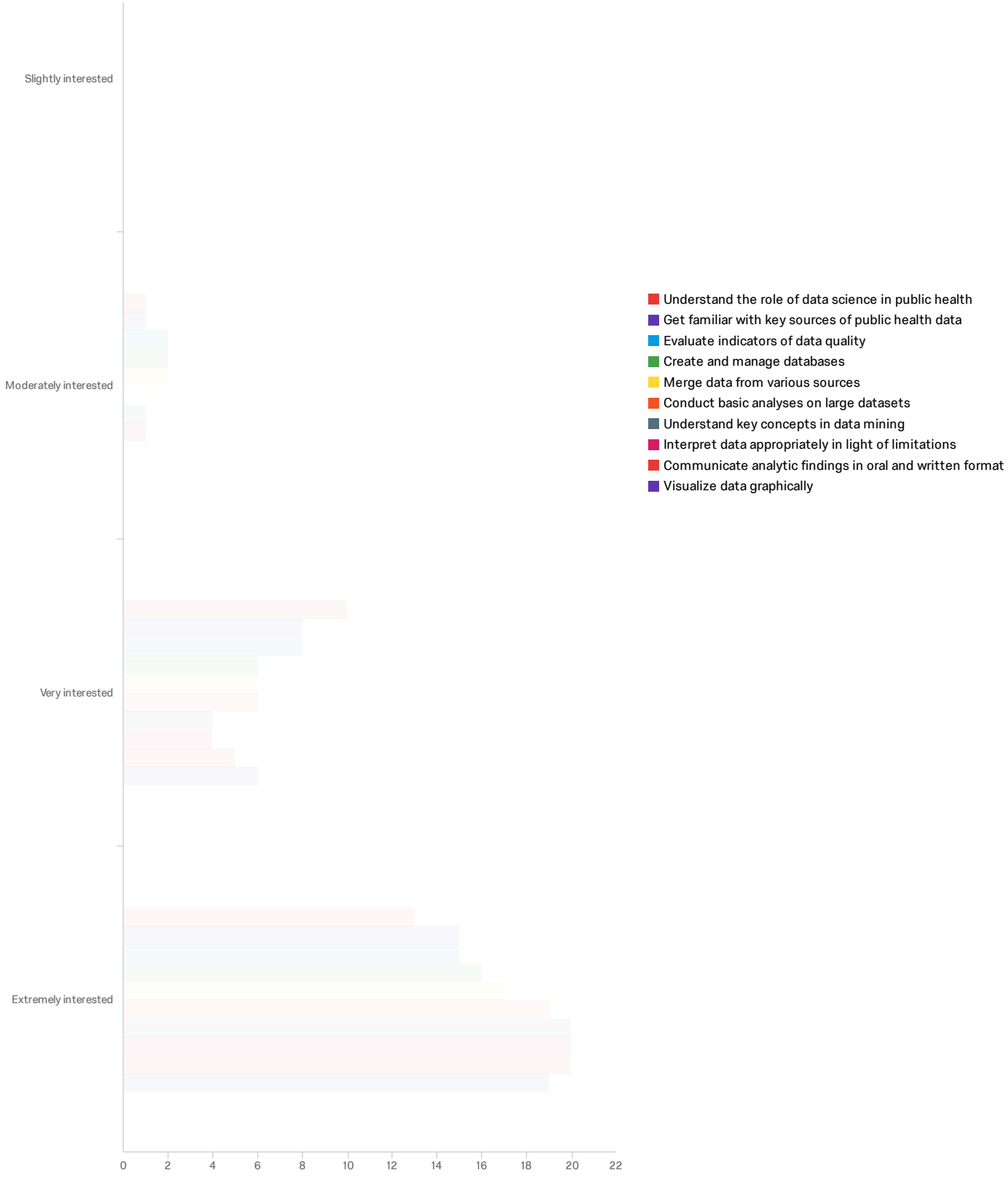


Very Interested





Extremely interested



Not at all interested

#	Field	Not at all interested	Slightly interested	Moderately interested	Very interested	Extremely interested	Total
1	Understand the role of data science in public health	40.00% 4	20.00% 2	30.00% 3	0.00% 0	10.00% 1	10

#	Field	Not at all interested	Slightly interested	Moderately interested	Very interested	Extremely interested	Total
2	Get familiar with key sources of public health data	40.00% 4	20.00% 2	40.00% 4	0.00% 0	0.00% 0	10
3	Evaluate indicators of data quality	70.00% 7	0.00% 0	20.00% 2	10.00% 1	0.00% 0	10
4	Create and manage databases	80.00% 8	10.00% 1	10.00% 1	0.00% 0	0.00% 0	10
5	Merge data from various sources	80.00% 8	0.00% 0	20.00% 2	0.00% 0	0.00% 0	10
6	Conduct basic analyses on large datasets	70.00% 7	0.00% 0	20.00% 2	10.00% 1	0.00% 0	10
7	Understand key concepts in data mining	60.00% 6	20.00% 2	20.00% 2	0.00% 0	0.00% 0	10
8	Interpret data appropriately in light of limitations	70.00% 7	10.00% 1	20.00% 2	0.00% 0	0.00% 0	10
9	Communicate analytic findings in oral and written format	60.00% 6	20.00% 2	10.00% 1	0.00% 0	10.00% 1	10
10	Visualize data graphically	50.00% 5	30.00% 3	20.00% 2	0.00% 0	0.00% 0	10

Showing rows 1 - 10 of 10

Slightly interested

#	Field	Not at all interested	Slightly interested	Moderately interested	Very interested	Extremely interested	Total
1	Understand the role of data science in public health	0.00% 0	25.93% 7	48.15% 13	18.52% 5	7.41% 2	27
2	Get familiar with key sources of public health data	3.70% 1	25.93% 7	40.74% 11	18.52% 5	11.11% 3	27
3	Evaluate indicators of data quality	7.41% 2	40.74% 11	33.33% 9	11.11% 3	7.41% 2	27
4	Create and manage databases	7.41% 2	40.74% 11	29.63% 8	14.81% 4	7.41% 2	27
5	Merge data from various sources	14.81% 4	33.33% 9	29.63% 8	18.52% 5	3.70% 1	27
6	Conduct basic analyses on large datasets	22.22% 6	29.63% 8	22.22% 6	14.81% 4	11.11% 3	27
7	Understand key concepts in data mining	11.11% 3	33.33% 9	25.93% 7	22.22% 6	7.41% 2	27
8	Interpret data appropriately in light of limitations	0.00% 0	44.44% 12	40.74% 11	7.41% 2	7.41% 2	27
9	Communicate analytic findings in oral and written format	3.70% 1	25.93% 7	40.74% 11	22.22% 6	7.41% 2	27
10	Visualize data graphically	0.00% 0	29.63% 8	18.52% 5	40.74% 11	11.11% 3	27

Showing rows 1 - 10 of 10

Moderately interested

#	Field	Not at all interested	Slightly interested	Moderately interested	Very interested	Extremely interested	Total
1	Understand the role of data science in public health	2.04% 1	16.33% 8	42.86% 21	24.49% 12	14.29% 7	49
2	Get familiar with key sources of public health data	2.04% 1	14.29% 7	44.90% 22	26.53% 13	12.24% 6	49
3	Evaluate indicators of data quality	0.00% 0	32.65% 16	30.61% 15	22.45% 11	14.29% 7	49
4	Create and manage databases	14.29% 7	18.37% 9	34.69% 17	20.41% 10	12.24% 6	49
5	Merge data from various sources	4.08% 2	20.41% 10	44.90% 22	20.41% 10	10.20% 5	49
6	Conduct basic analyses on large datasets	4.08% 2	20.41% 10	36.73% 18	32.65% 16	6.12% 3	49
7	Understand key concepts in data mining	6.12% 3	24.49% 12	30.61% 15	26.53% 13	12.24% 6	49
8	Interpret data appropriately in light of limitations	2.04% 1	24.49% 12	22.45% 11	30.61% 15	20.41% 10	49
9	Communicate analytic findings in oral and written format	6.12% 3	6.12% 3	38.78% 19	18.37% 9	30.61% 15	49
10	Visualize data graphically	0.00% 0	10.20% 5	34.69% 17	22.45% 11	32.65% 16	49

Showing rows 1 - 10 of 10

Very Interested

#	Field	Not at all interested	Slightly interested	Moderately interested	Very interested	Extremely interested	Total
1	Understand the role of data science in public health	3.57% 1	0.00% 0	25.00% 7	53.57% 15	17.86% 5	28
2	Get familiar with key sources of public health data	0.00% 0	3.57% 1	17.86% 5	53.57% 15	25.00% 7	28
3	Evaluate indicators of data quality	3.57% 1	3.57% 1	28.57% 8	46.43% 13	17.86% 5	28
4	Create and manage databases	0.00% 0	14.29% 4	28.57% 8	35.71% 10	21.43% 6	28
5	Merge data from various sources	3.57% 1	7.14% 2	25.00% 7	46.43% 13	17.86% 5	28
6	Conduct basic analyses on large datasets	3.57% 1	7.14% 2	10.71% 3	60.71% 17	17.86% 5	28
7	Understand key concepts in data mining	3.57% 1	3.57% 1	28.57% 8	46.43% 13	17.86% 5	28
8	Interpret data appropriately in light of limitations	3.57% 1	3.57% 1	10.71% 3	46.43% 13	35.71% 10	28
9	Communicate analytic findings in oral and written format	0.00% 0	7.14% 2	17.86% 5	39.29% 11	35.71% 10	28
10	Visualize data graphically	0.00% 0	3.57% 1	3.57% 1	42.86% 12	50.00% 14	28

Showing rows 1 - 10 of 10

Extremely interested

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

Showing rows 1 - 10 of 10

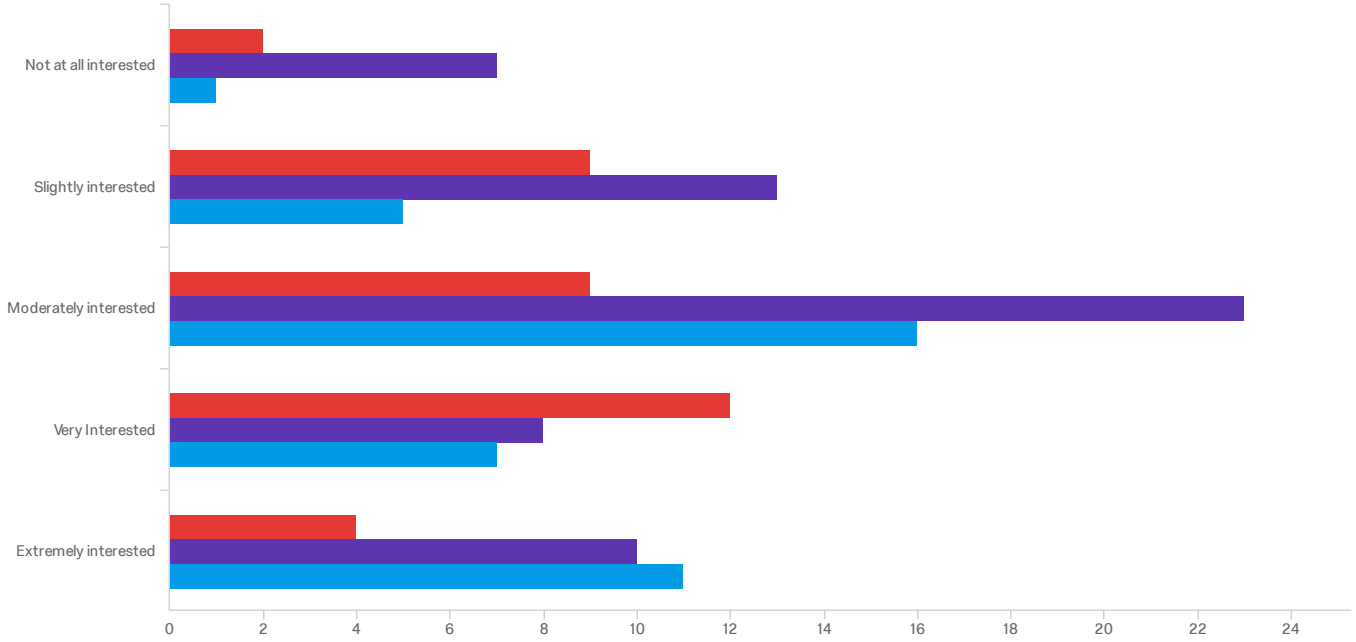
Q6 - We are considering offering the minor classes in a series of four 7.5 week sessions. This will allow students to build skills in succession and ensure continuity of the learning objectives. How appealing is this format to you?

Data source misconfigured for this visualization.

#	Field	Not at all interested	Slightly interested	Moderately interested	Very Interested	Extremely interested	Total
1	Not at all appealing	50.00% 2	25.00% 1	0.00% 0	25.00% 1	0.00% 0	4
2	Not appealing	12.50% 1	37.50% 3	37.50% 3	12.50% 1	0.00% 0	8
3	Somewhat appealing	8.33% 4	25.00% 12	37.50% 18	14.58% 7	14.58% 7	48
4	Appealing	6.25% 3	16.67% 8	45.83% 22	20.83% 10	10.42% 5	48
5	Extremely appealing	0.00% 0	10.34% 3	17.24% 5	27.59% 8	44.83% 13	29

Showing rows 1 - 5 of 5

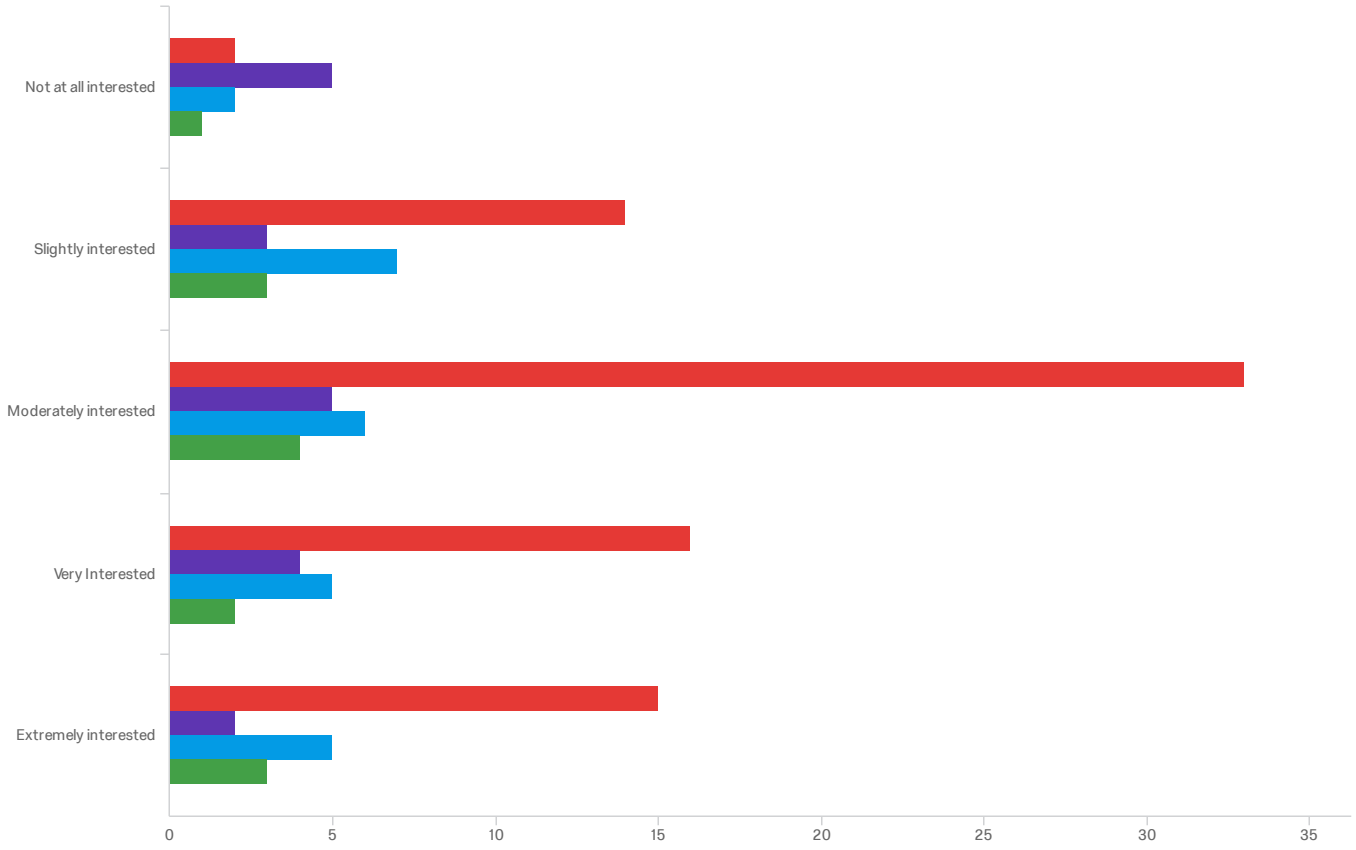
Q7 - What is your preferred mode of learning?



#	Field	Not at all interested	Slightly interested	Moderately interested	Very Interested	Extremely interested	Total
1	Online	5.56% 2	25.00% 9	25.00% 9	33.33% 12	11.11% 4	36
2	In-person	11.48% 7	21.31% 13	37.70% 23	13.11% 8	16.39% 10	61
3	Hybrid	2.50% 1	12.50% 5	40.00% 16	17.50% 7	27.50% 11	40

Showing rows 1 - 3 of 3

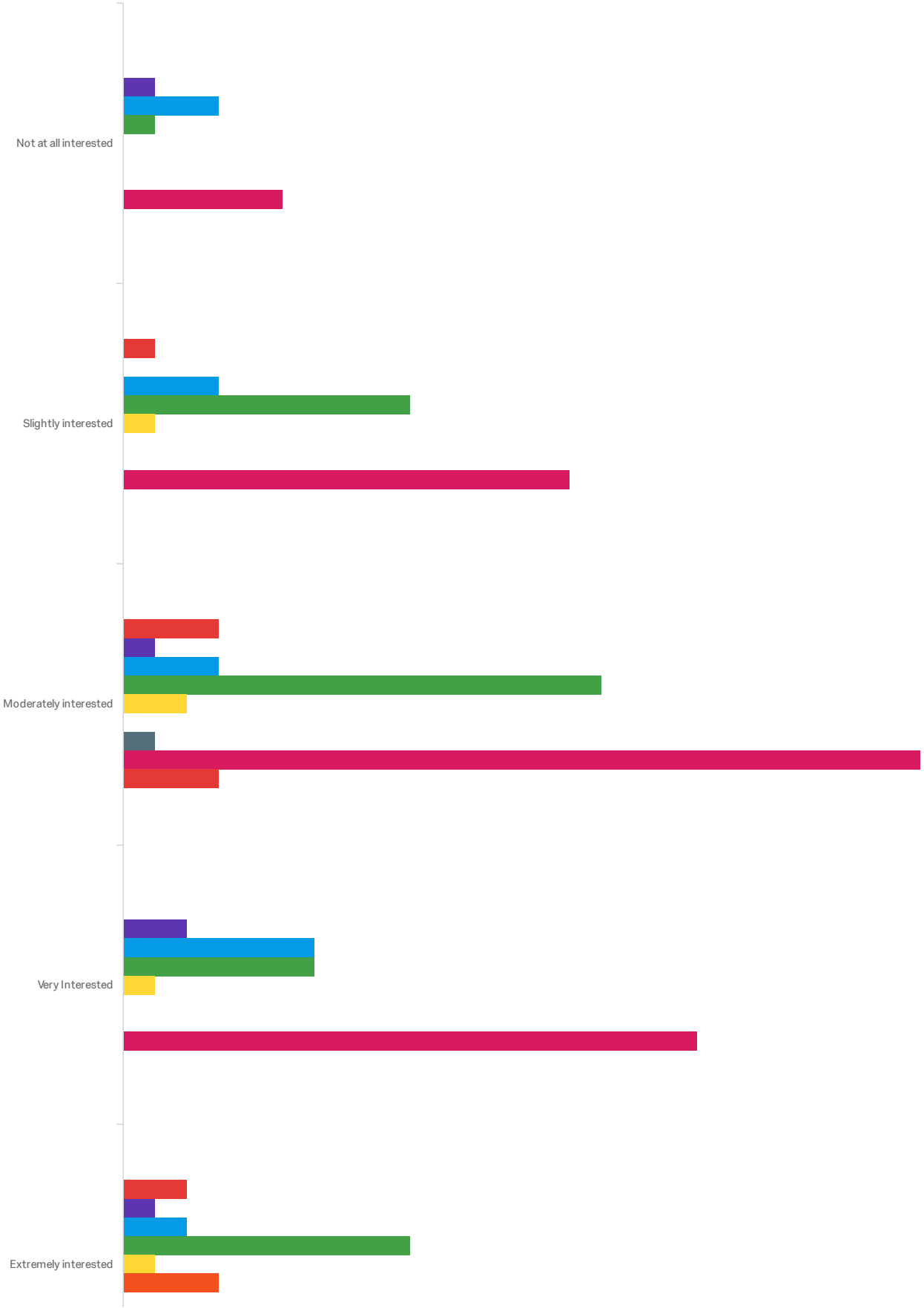
Q8 - If you don’t already have coding skills, would you be willing to take an introduction to computer coding course prior to entry into the minor?

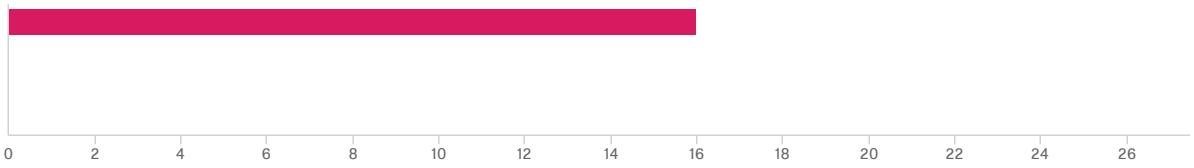


#	Field	Not at all interested	Slightly interested	Moderately interested	Very Interested	Extremely interested	Total
1	Yes	2.50% 2	17.50% 14	41.25% 33	20.00% 16	18.75% 15	80
2	No	26.32% 5	15.79% 3	26.32% 5	21.05% 4	10.53% 2	19
3	Unsure	8.00% 2	28.00% 7	24.00% 6	20.00% 5	20.00% 5	25
4	N/A, I already have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

Showing rows 1 - 4 of 4

Q10 - With which race/ethnicity do you identify?





#	Field	Not at all interested	Slightly interested	Moderately interested	Very Interested	Extremely interested	Total
1	African American or Black	0.00% 0	16.67% 1	50.00% 3	0.00% 0	33.33% 2	6
2	American Indian or Alaska Native	20.00% 1	0.00% 0	20.00% 1	40.00% 2	20.00% 1	5
3	Asian American or Asian	17.65% 3	17.65% 3	17.65% 3	35.29% 6	11.76% 2	17
4	Hispanic or Latino	2.50% 1	22.50% 9	37.50% 15	15.00% 6	22.50% 9	40
5	Middle Eastern	0.00% 0	20.00% 1	40.00% 2	20.00% 1	20.00% 1	5
6	Multiracial	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 3	3
7	Pacific Islander	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1
8	White or Caucasian	6.41% 5	17.95% 14	32.05% 25	23.08% 18	20.51% 16	78
9	An identity not listed, self-identify:	0.00% 0	0.00% 0	100.00% 3	0.00% 0	0.00% 0	3

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

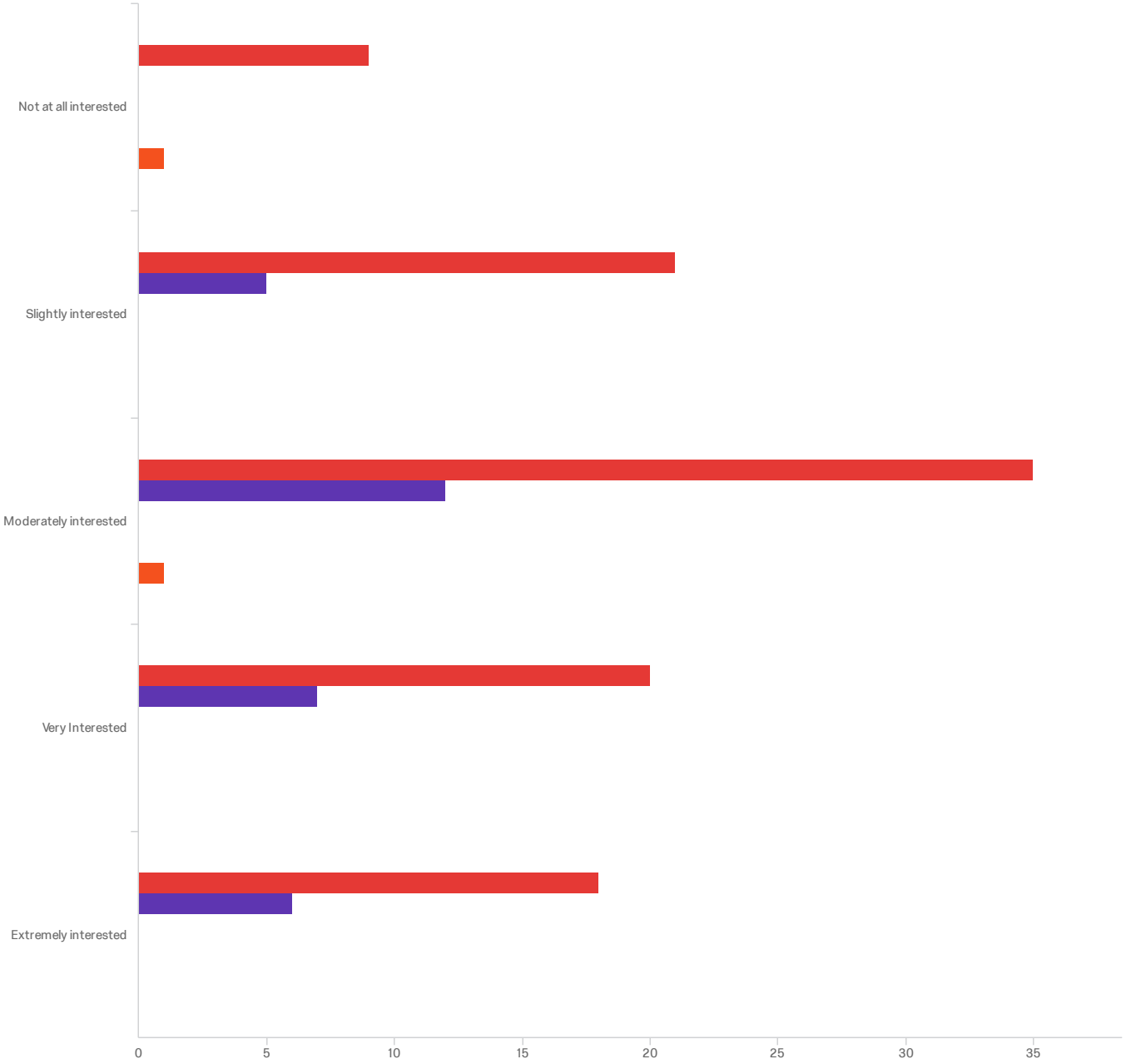
Very Interested

An identity not listed, self-identify:

Extremely interested

An identity not listed, self-identify:

Q11 - With which gender do you identify?



#	Field	Not at all interested	Slightly interested	Moderately interested	Very Interested	Extremely interested	Total
1	Woman	8.74% 9	20.39% 21	33.98% 35	19.42% 20	17.48% 18	103
2	Man	0.00% 0	16.67% 5	40.00% 12	23.33% 7	20.00% 6	30
3	Transgender	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
4	Non-binary	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0
5	Genderqueer or gender nonconforming	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0

#	Field	Not at all interested	Slightly interested	Moderately interested	Very Interested	Extremely interested	Total
6	An identity not listed, self-identify:	50.00% 1	0.00% 0	50.00% 1	0.00% 0	0.00% 0	2

Showing rows 1 - 6 of 6

An identity not listed, self-identify:

Not at all interested

An identity not listed, self-identify:

Shiskaboban

Slightly interested

An identity not listed, self-identify:

Moderately interested

An identity not listed, self-identify:

n/a

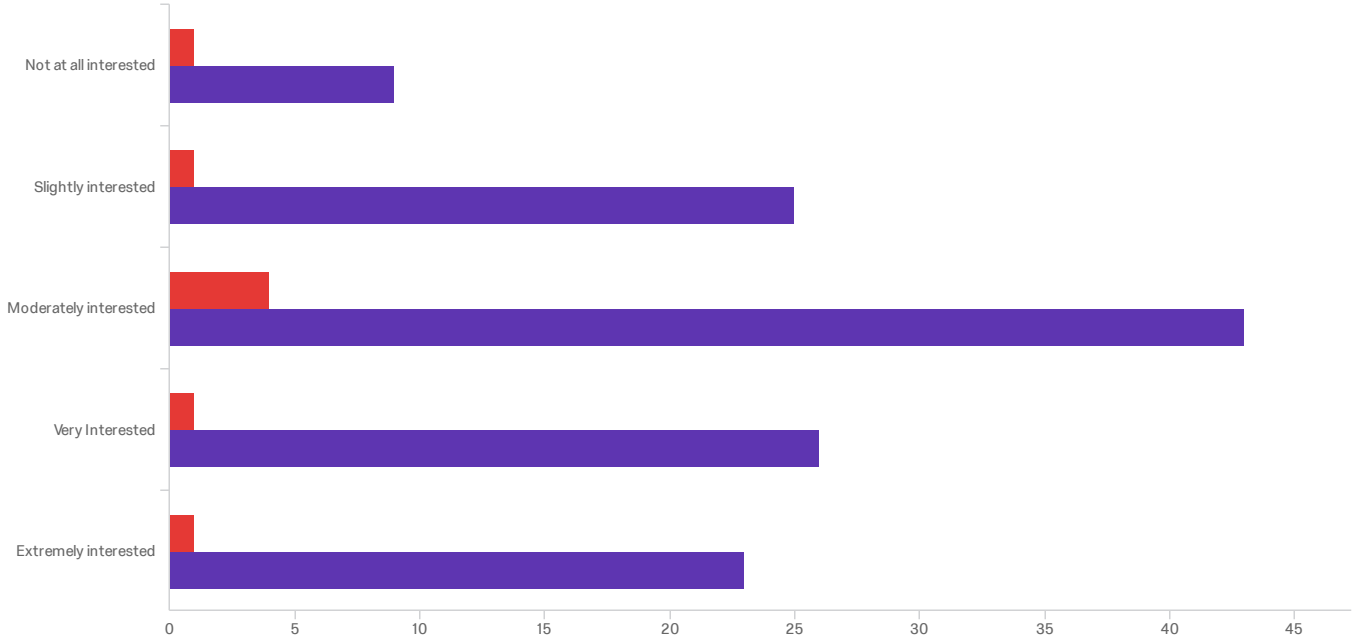
Very Interested

An identity not listed, self-identify:

Extremely interested

An identity not listed, self-identify:

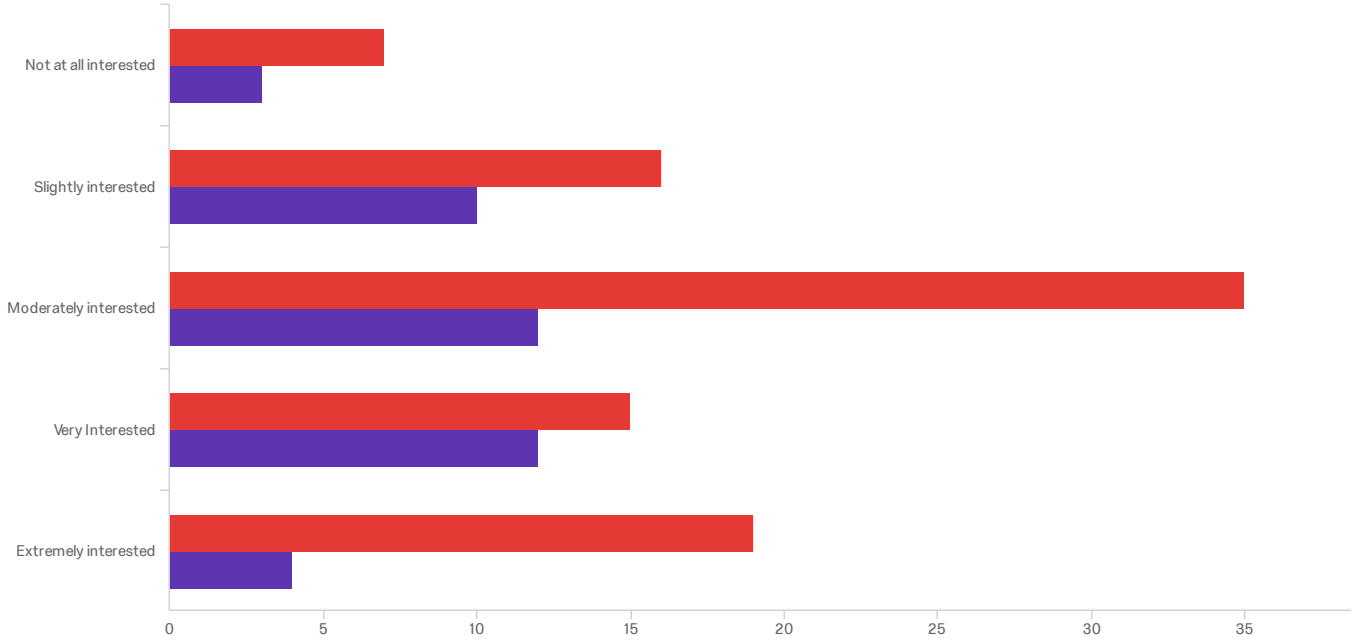
Q12 - Do you identify as someone with a disability or impairment?



#	Field	Not at all interested	Slightly interested	Moderately interested	Very Interested	Extremely interested	Total
1	Yes	12.50% 1	12.50% 1	50.00% 4	12.50% 1	12.50% 1	8
2	No	7.14% 9	19.84% 25	34.13% 43	20.63% 26	18.25% 23	126

Showing rows 1 - 2 of 2

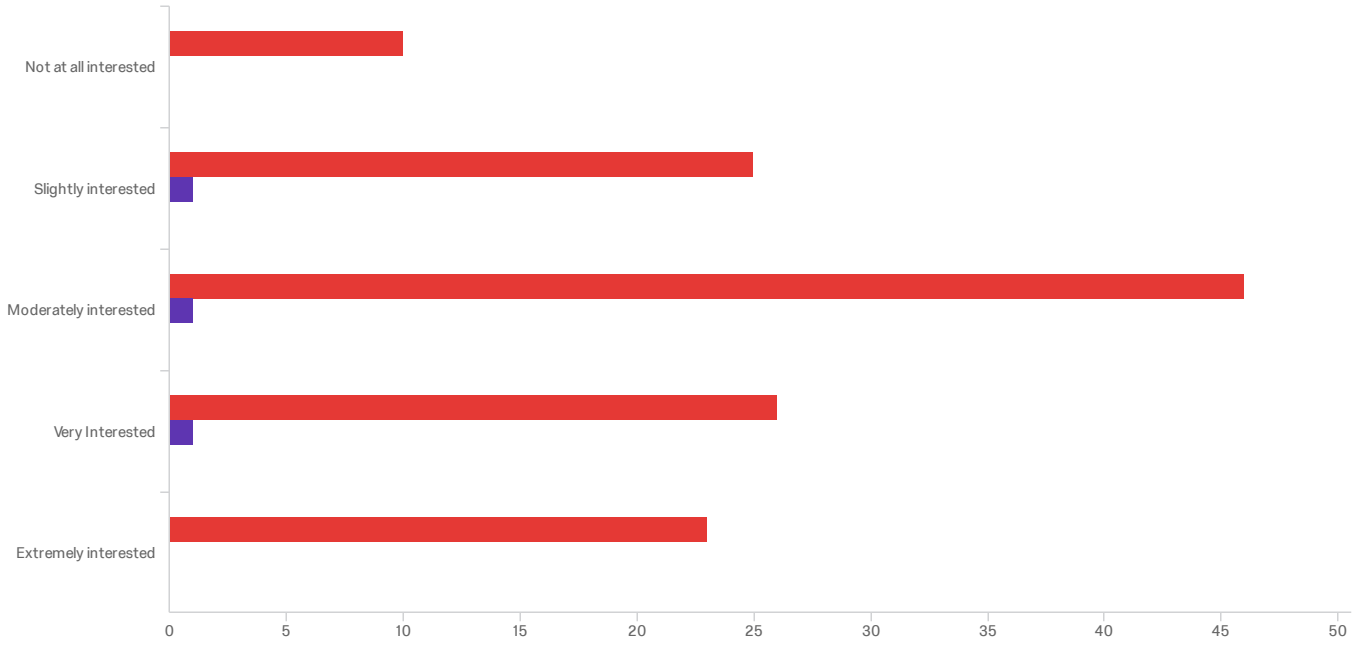
Q13 - Have either of your parent(s) or guardians earned a bachelor's degree or higher?



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

Showing rows 1 - 2 of 2

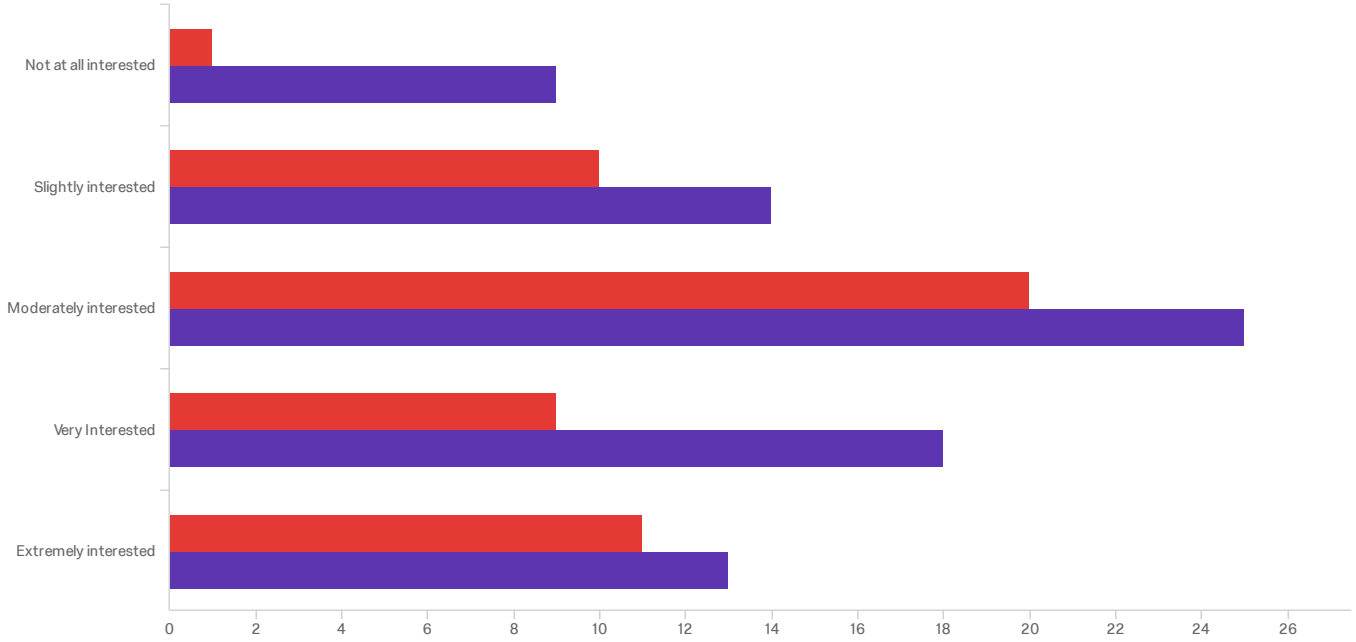
Q14 - Do you identify as an active member or veteran of the U.S. Armed Forces, Reserves, or National Guard?



#	Field	Not at all interested	Slightly interested	Moderately interested	Very Interested	Extremely interested	Total
1	No	7.69% 10	19.23% 25	35.38% 46	20.00% 26	17.69% 23	130
2	Yes, veteran	0.00% 0	33.33% 1	33.33% 1	33.33% 1	0.00% 0	3
3	Yes, active duty	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0

Showing rows 1 - 3 of 3

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



#	Field	Not at all interested	Slightly interested	Moderately interested	Very Interested	Extremely interested	Total
1	Yes	1.96% 1	19.61% 10	39.22% 20	17.65% 9	21.57% 11	51
2	No	11.39% 9	17.72% 14	31.65% 25	22.78% 18	16.46% 13	79

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

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

Would love an opportunity to take classes online or over the summer so I don't have to get behind in my major

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.

This survey does not tell much about the class but if this is a class that help students to analyze and present data useing 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.

n/a

I can't take it since I'm graduating, but it seems like a really good idea.

Very Interested

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

I wish this minor had existed earlier!

N/A

If in hybrid format, do meetings with data scientist in person and course material online.

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!

I agree continuity is important, 2 7.5 week courses is a hefty load for students and may cause them to complete mediocre work.

Extremely interested

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

Cost of the Minor/the week programming. Times the courses are offered for the minor. Whether the courses can be "double-dipped" with other Public Health major courses.

Would love this but graduate next fall!

This minor sounds like a great idea, my only regret is that I'll have graduate by the time it is an option.

n/a

None

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.

This sounds like a fun minor that I need to graduate. Make it fast so I can start taking classes

THIS IS SUCH A NECESSARY MINOR FOR PUBLIC HEALTH STUDENTS TO GAIN TECHNICAL SKILLS. SERIOUSLY.

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

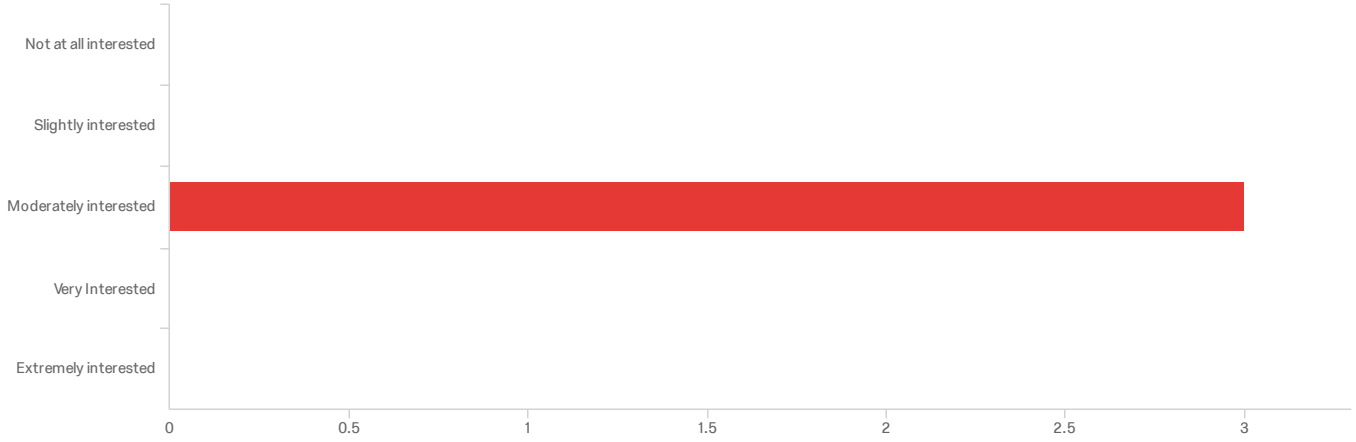
I am graduating but I would have 100000% done this minor. Looking for jobs now I really think this would have been an amazing asset to my learning here.

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.

TEST

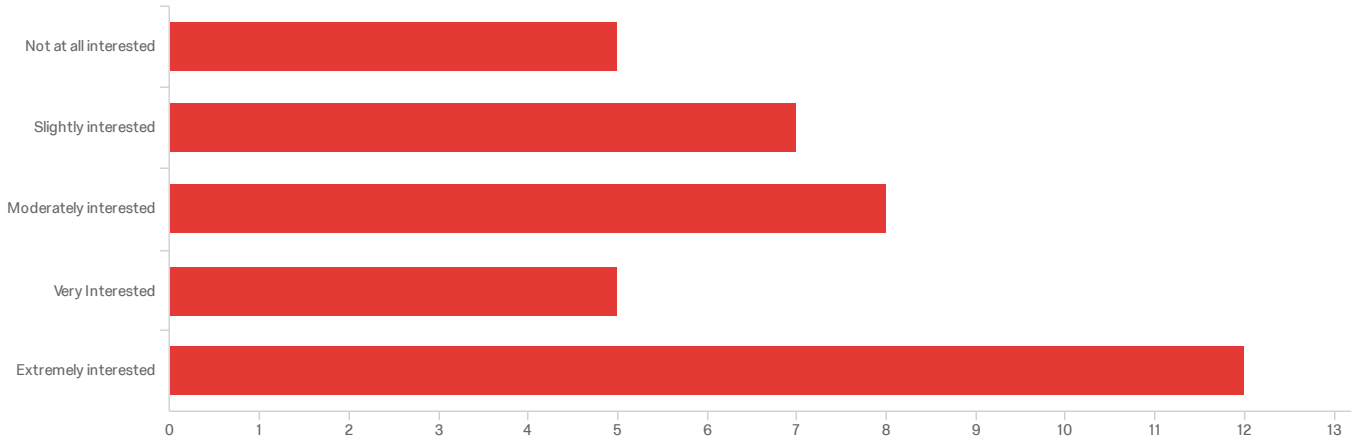
Q10_9_TEXT - Topics



#	Field	Not at all interested	Slightly interested	Moderately interested	Very Interested	Extremely interested	Total
1	Unknown	0.00% 0	0.00% 0	100.00% 3	0.00% 0	0.00% 0	3

Showing rows 1 - 1 of 1

Q15 - Topics



#	Field	Not at all interested	Slightly interested	Moderately interested	Very Interested	Extremely interested	Total
1	Unknown	100.00% 5	100.00% 7	100.00% 8	100.00% 5	100.00% 12	37

Showing rows 1 - 1 of 1

End of Report

CURRICULUM VITAE

ZHAO CHEN, PhD, MPH

March 2018

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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.

2003-2005 Director of Epidemiology Concentration, Master of Public Health, Mel and Enid Zuckerman Arizona College of Public Health, 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.

2012— Now Chinese Academy of Sciences appointed overseas expert

SERVICE/OUTREACH

- ***Local/State***

1996 – 2003 Member, Seniors & Family Resource and Wellness Centers Comm.
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.
1999 - 2000 Editor, Chinese Journal of Osteoporosis.
2000 - 2003 Reviewer, Cancer Epidemiology, Biomarkers & Prevention.
2000 - 2003 Chair of Working Group on Alternative Treatments for Osteoporosis, International Chinese Hard Tissue Society

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	American School of Public Health (workforce for competencies in MPH)
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 (Feb22-23)
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	Moderator, Concurrent Oral Session 9, Epidemiology I: Hip Fractures. American Society of Bone and Mineral Research 29th Annual Meeting, September 2007, 16-19, Honolulu, Hawaii.
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
2010	Chinese Body Composition Measurement Workshop (Organized by Chinese Society of Anatomical Sciences between Jan 8 and Jan 15, 2010, Jingzhou, Liaoning, China). Workshop Director.
2011	Advanced Body Composition Workshop (Organized by the Chinese Society for Anatomical Sciences, August 5-8, 2011, Guiyan, Guizhou, China), Workshop Director.
2011	Reviewer for the NIAMS P60 MCRC review meeting. November 29-30, 2011. Washington DC.
2012	Reviewer for NIH Special Emphasis Panel/Scientific Review Group 2012/05 NAME. Feb 9-10 2012.
2012	Reviewer for NIA/NIH, NATIONAL INSTITUTE ON AGING, BETHESDA, MD (250632). March 9th 2012.
2012	Review for NIH 2012/10 ZAG1 ZIJ-5 (05). Muscular Skeletal Health in Aging men. National Institute on Aging. June 12th, 2012.
2012	Reviewer for NIH/NIAMS Emphasis Panel for review of P60 grants. Hilton Washington/Rockville, Rockville, MD (254247). Nov 29th -30th, 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

2013 Reviewer for NIH 2014/01 ZRG1 MOSS-S (10) B Small Business: Orthopedic and Skeletal Biology, mail in. Nov 21. 2013

2014 Review for NIH Musculoskeletal Tissue Engineering Study Section [MTE] Small Business Orthopedics Study Section (SBIR/STTR), Feb 12-13, 2014.

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 CDCNational Center on Birth Defects and Developmental Disabilities Special Emphasis Panel: Surveillance and Research of Muscular Dystrophies and Neuromuscular Disorders, ZDD1 EEO (03), April 22, 2014 - April 24, 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 ZAG1 ZIJ-3 (M3). A PROOF OF CONCEPT RANDOMIZEDTRIAL OF MULTIMODALITY INTERVENTION IN HIP FRACTURE. Feb 5th, 2015.

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***

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)***

1. **Chen Z**. The growth of 2-6 years old kindergartner in Beijing. *Acta Anthropol Sin* 1987; 6(1):46-54 (with English abstract).
2. Stini WA, Stein P, **Chen Z**. Bone remodeling in old age: longitudinal monitoring in Arizona. *American Journal of Human Biology* 1992; 4:47-55.
3. Stini WA, **Chen Z**, Stein P. Aging, bone loss and body mass index in Arizona retirees. *American Journal of Human Biology* 1994; 6(1):43-50.
4. **Chen Z**, Lohman TG, Stini WA, Ritenbaugh C and Aickin M. Fat or lean tissue, which one is the major determinant of bone mineral mass in healthy postmenopausal women? *Journal of Bone and Mineral Research* 1997; 12:144-151. [PMID: 9240737]
5. **Chen Z**, Maricic M, Lund P, Tesser J, Gluck O. How the new Hologic hip normal reference values affect the densitometric diagnosis of osteoporosis. *Osteoporosis International* 1998; 8(5):423-427. [PMID:9850349]
6. Maricic M, Jesser J, **Chen Z**, Lund P, Gluck O. How often does lateral spine DEXA detect low bone mass in patients with a normal AP spine and hip. *Journal of Clinical Densitometry* 1998; 10: 1045-1050. [PMID:15304896]
7. Marshall JR, **Chen Z**, Diet and health risk: risk patterns and disease-specific associations. *American Journal of Clinical Nutrition* 1999;69 (suppl):1351S-6S.
8. Maricic M, **Chen Z.** Bone densitometry. *Clinics in Laboratory Medicine* 2000; 20 (3): 469-488. [PMID:10359236]
9. Villa ML, **Chen Z**. Osteoporosis: Understanding ethnic differences. *Annals of Long-Term Care* 2000; 8: 52-55 (special issue).

10. Nicholas SJ, **Chen Z**. Osteoporosis in Native Americans. *The IHS Primary Care Provider* 2002; 27 (5): 94-101.
11. Morimoto LM; White E; **Chen Z**; Chlebowski RT, Hays J, Kuller L, Ana Marie Lopez AM, Manson J, Margolis KL, Muti PC, Stefanick, ML; McTiernan A. Obesity, body size, and risk of postmenopausal breast cancer: the Women's Health Initiative (United States). *Cancer Causes and Control* 2002; 13:741-751. [PMID:12420953]
12. **Chen Z,** Maricic M, Nguyen P, Ahmann FR, Bruhn R, Dalkin BL. Low Bone density and high percentage of body fat among men who were treated with androgen deprivation therapy for prostate carcinoma. *Cancer* 2002; 95:2136-44. [PMID:12412167]
13. **Chen Z**, Pettinger MB, Ritenbaugh C, LaCroix AZ, Robbins J, Caan BJ, Barad DH, Hakim IA. Habitual Tea Consumption and Risk of Osteoporosis -- A Prospective Study in the Women's Health Initiative Observational Cohort. *American Journal of Epidemiology* 2003, 158:772-81. [PMID:14561667]
14. LaCroix A, Cauley J, Pettinger M, Hisa J, Bauer D, McGowan J, **Chen Z**, Lewis C, McNeeley SG, Maureen Pasaro, Jackson R. Statin use, osteoporotic fracture and level of bone density in postmenopausal women, results from the Women's Health Initiative Observational Study. *Annals of Internal Medicine* 2003; 139:97-104. [PMID:12859159]
15. Cauley JA, Robbins J, **Chen Z**, Cummings SR, Jackson R, LaCroix A, LeBoff M, Lewis CE, McGowan J, Neuner J, Pettinger M, Stefanick ML, Wactawski-Wende J, Watts N. Estrogen Plus Progestin Reduces The Risk of Fracture: Expanded Analyses Of Fracture And Bone Mineral Density. The Women's Health Initiative Randomized Controlled Trial. *JAMA* 2003; 290:1729-38. [PMID:14519707]
16. **Chen Z,** Kooperberg C, Pettinger MB, Bassford T, Cauley JA, LaCroix AZ, Lewis CE, Kipersztok S, Borne MC, Jackson RD. Validity of Self-Report for Fractures among a Postmenopausal Multiethnic Cohort. *Menopause* 2004; 11(3): 264-274. [PMID:15167305]
17. **Chen Z,** Staten LK, Maskarinec G, Arendell L, Bruhn R, Nicholas SJ, Marshall J. The relationship between mammographic density and body composition **---**Results from a cross-sectional study among Hispanic and non-Hispanic White women. *International Journal of Body Composition Research* 2004; 2 (1): 23-29. [PMID:18090034]
18. **Chen Z,** Stini WA, Marshall JR, Martinez ME, Guillén-Rodríguez JM, Roe D, Alberts DS. Wheat Bran Fiber Supplementation and Bone Loss among Participants in a Colon Cancer Prevention Trial. *Nutrition* 2004; 20:747-751. [PMID:15325680]
19. **Chen Z**, Maricic M, Bassford TL, Pettinger M, Ritenbaugh C, Lopez AM, Barad DH, Gass M, Leboff MS. Fracture Risk among Breast Cancer Survivors-Results from the Women's Health Initiative. *Archive of Internal Medicine* 2005; 165:552-228. [PMID:15767532]
20. Chlebowski RT, **Chen Z**, Anderson G, Rohan T, Aragaki A, Land D, Dolan NC, Paskett ED, McTiernan A, Hubbell FA, Adams-Campbell LL, Prentice R. Ethnicity and breast cancer: Factors Influencing Differences in Incidence and Outcome. *Journal of National Cancer Institute* 2005; 97:439-48. [PMID:15770008]
21. Wampler NS, **Chen Z**, Jacobsen C, Henderson JA, Barbara V. Howard BV, Rossouw JE. Bone mineral density of American Indian and Alaska Native women: Results from the Women's Health Initiative Study. *Menopause* 2005; 12:536-544. [PMID:16145307]
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

Postmenopausal Survivors of Breast Cancer --- Results from a Subgroup in the Women's Health Initiative Observational Study. *Cancer* 2005; 104:1520-30. [PMID:16110508]

23. **Chen Z**, Bassford T, Green SB, Cauley JA, Jackson RD, LaCroix AZ, Leboff M, Stefanick ML, Margolis KL. Postmenopausal Hormone Therapy and Body Composition --- Results from the Women's Health Initiative E & P Clinical Trial. *The American Journal of Clinical Nutrition* 2005; 82:651-6. [PMID:16155280]
24. Wang ZM, Heshka S, Wang J, Gallagher D, Deurenberg P, **Chen Z**, Heymsfield SB. Metabolically-active portion of fat-free mass: a cellular body composition level modeling analysis. *American Journal of Physiology-Endocrinology and Metabolism* 2006; 292:49-53. [PMID:16882929]
25. Thomson CA, Arendell LA, Bruhn RL, Maskarinec G, Lopez AM, Wright NC, Moll CE, Aickin M, **Chen Z.** Pilot study of dietary influences on mammographic density in pre- and postmenopausal Hispanic and non-Hispanic white women. *Menopause* 2007 Mar-Apr; 14 (2): 243-50. [PMID: 17091096]
26. Maskarinec G, Pagano I, **Chen Z**, Nagata C, Gram IT. Ethnic and Geographic Differences in Mammographic Density and their Association with Breast Cancer Incidence. *Breast Cancer Research and Treatment* 2007; 104(1):47-56. [PMID:17009106]
27. Maskarinec G, **Chen C,** Gram IT, Nagata C, Takata Y, Pagano I, Hayashi K, Arendell L, Skeie G. IGF-I and Mammographic Density in Four Geographic Locations: A Pooled Analysis. *International Journal of Cancer* 2007; 121:1786-1792. [PMID:17520679]
28. Wang ZM, Heshka S, Pietrobelli A, **Chen Z**, Silva AM, Sardinha LB, Wang J, Gallager D, Heymsfield SB. Total-Body Skeletal Muscle Mass in Children: A New Total-Body Potassium Method. *Journal of Nutrition* 2007; 137:1988-1991. [PM ID:17634275]
29. Cauley JA, Wu L, Wampler NS, Barnhart JM, Allison M, **Chen Z**, Jackson R and Robbins J. Clinical Risk Factors for Fractures in Multiethnic Women: The Women's Health Initiative. Journal of Bone and Mineral Research Clinical Risk Factors for Fractures in Multi-Ethnic Women: The Women's Health Initiative. *Journal of Bone and Mineral Research* 2007; 22(11):1816-1826. [PMID:17638574]
30. **Chen Z**, Wang ZM, Lohman T, Heymsfield SB, Outwater E, Nicholas JS, Bassford T, LaCroix A, Punyanitya M, Wu G, Sherrill D, Going S. DXA is a reliable tool for assessing skeletal muscle mass in older women. *J. Nutr.* 2007; 137:2775-2780. [PMID:18029498]
31. Robbins J, Agaki A, Kooperberg C, Watts NB, Wactawski-Wende J, Jackson R, MS. LeBoff, Lewis CE, **Chen Z**, Stefanick M, Cauley JA. Factors associated with 5-year risk of hip fracture in postmenopausal women. *JAMA* 2007; 298:2389-2398. [PMID:18042916]
32. Caire-Juvera G, Arendell LA, Maskarinec G, Thomson CA, **Chen Z**. Association between breast density and body composition components in Hispanic and non-Hispanic white women by menopausal status. *Menopause* 2008; 15(2):319-25. [PMID:18090034]
33. **Chen Z**, Arendell L, Aickin M, Cauley J, Lewis CE, Chlebowski R. Hip Bone Density Predicts Breast Cancer Risk Independently of Gail Score—Results from the Women's Health Initiative. *Cancer* 2008; 113(5):907-915 (published with editorial). [PMID:18666209]

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]
35. Cauley JA, Wampler NS, Barnhart JM, Wu L, Allison M, **Chen Z**, Hendrix S, Robbins J, and Jackson RD. Incidence of fractures compared to cardiovascular disease and breast cancer: the Women's Health Initiative Observational Study. Osteoporos International 2008; 19:1717-23. [PMID:18629572]
36. **Chen Z,** Beck TJ, Cauley JA, Lewis CE, LaCroix A, Bassford T, Wu G, Sherrill D, Going S. Hormone Therapy Improves Femur Geometry Among Ethnically Diverse Postmenopausal Participants in the Women's Health Initiative Hormone Intervention Trials. *Journal of Bone and Mineral Research* 2008; 23:1935-1945. [PMID:18665788]
37. Caire-Juvera G, Ritenbaugh C, Wactawski-Wende J, Snetselaar L, **Chen Z**. Vitamin A intake and the risk of fractures among participants of the Women's *Health Initiative Observational Study.* American Journal of Clinical Nutrition *2009; 89:323-30. [PMID:19056568].*
38. **Chen Z,** Maricic M, Aragaki AK, Mouton C, Arendell L, Lopez AM, Bassford T, Chlebowski RT. Fracture risk increases after diagnosis of breast or other cancers in postmenopausal women: results from the Women's Health Initiative. Osteoporos International 2009; ***20(4):527-36.*** [PMID:18766294]
39. Budhiraja P, **Chen Z**, Popovtzer M. Sodium bicarbonate versus normal saline for protection against contrast nephropathy. *Renal Failure* 2009; 31(2):118-123. [PMID:19212908]
40. Beck TJ, Petit M, Wu G; LeBoff MS, Cauley JA, **Chen Z**. Does obesity really make the femur stronger? Bone Mineral Density, Geometry and Fracture Incidence in the Women's Health Initiative-Observational Study. *Journal of Bone and Mineral Research* 2009; 24(8):1369-79. [PMID 19292617]
41. Bea JW, Zhao Q, Cauley JA, LaCroix A, Bassford T, Lewis CE, Jackson R, Tylavsky FA, **Chen Z**. Effect of hormone therapy on lean body mass, falls, and fractures: Six-year results from the Women's Health Initiative Hormone Trials. *Menopause* 2010 Jan; 18(1):44-52. [PMID: 20689466]
42. Cauley JA, LaCroix AZ, Robbins JA, Larson J, Wallace R, Wactawski-Wende J, **Chen Z**, Bauer DC, Cummings SR, Jackson R. Serum Estradiol and Fracture Reduction During Treatment With Hormone Therapy: The Women's Health Initiative Randomized Trial. *Osteoporos International* 2010 Jan; 21(1):167-77. [PMID: 19436934]
43. Carbone L, Buzkova P, Fink HA, Lee JS, **Chen Z**, Ahmed A, Parashar S and Robbins JR. Hip Fractures and Heart Failure: Findings from the Cardiovascular Health Study. *Eur Heart J.* 2010 Jan; 31(1):77-84. [PMID: 19892715]
44. Farr JN; Tomás R; **Chen Z**; Lisse JR.; Lohman TG; Going SB. Lower Trabecular Volumetric BMD at Metaphyseal Regions of Weight-bearing Bones is Associated with Prior Fracture in Young Girls. *Journal of Bone and Mineral Research* 2010 Feb; 26(2):380-7. [PMID: 20721933]
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]
46. Gray SL, LaCroix AZ, Larson J, Robbins J, Cauley JA, Manson JE, **Chen Z.** Proton Pump Inhibitor Use, Hip Fracture and Change in Bone Density In Postmenopausal Women-- Results from the Women's Health Initiative. *Archive of Internal Medicine* 2010 May 10; 170(9):765-71. [PMID: 20458083]

47. LaCroix AZ, Beck TJ, Cauley JA, Lewis CE, Bassford, T, Jackson R, Wu G, **Chen Z**. Hip Structural Geometry and Incidence of Hip Fracture in Postmenopausal Women: what does it add to conventional bone mineral density? *Osteoporos International* 2010 Jun; 21(6):919-29. [PMID: 19756830]
48. Chlebowski RT; **Chen Z**; Cauley JA, Rodabough R, McTiernan A; Lane DS; Manson JE; Snetselaar L; Yasmeen S; O'Sullivan MJ; Stafford M; Hendrix 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]
49. Nelson DA, Beck TJ, Wu G, Lewis CE, Bassford T, Cauley JA, LeBoff MS, Going SB, **Chen Z**. Ethnic differences in femur geometry in the women's health initiative observational study. *Osteoporos International* 2010 Aug 26; 22(5):1377-88. [PMID: 20737265]
50. Lee JS, Bůžková P, Fink HA, Vu J, Carbone L, **Chen Z**, Cauley J, Cappola AR, Robbins J. Subclinical thyroid dysfunction and incident hip fracture in older adults: The Cardiovascular Health Study. *Archives of Internal Medicine* 2010 Nov 22; 170(21):1876-83. [PMID: 21098345]
51. **Chen Z**, Thomson CA, Aickin M, Nicholas JS, Van Wyck D, Lewis CE, Jane A. Cauley JA, Bassford T. The Relationship between Incidence of Fractures and Anemia in Older Multiethnic Women. *Journal of the American Geriatrics Society* 2010 Dec; 58(12):2337-44. [PMID: 21143442]
52. Wang ZM, Heymsfield S, **Chen Z**, Zhu SK, Pierson R. In Vivo Human Elemental Composition. *Physics in Medicine and Biology* 2010, **55:** 2619 doi:10.1088/0031-9155/55/9/013
53. Beck TJ; Kohlmeier LA; Petit MA; Wu G; LeBoff MS; Cauley JA; Nicholas S, **Chen Z.** Confounders in the association between exercise and femur bone in postmenopausal women. *Medicine and Science in Sports and Exercise* 2011 Jan; 43(1):80-9. [PMID: 20473223]
54. Jackson RD, Wright NC, Beck TJ, Sherrill D, Cauley JA, Lewis CE, LaCroix AZ, LeBoff MS, Going S, Bassford T, **Chen Z**. Calcium plus vitamin D supplementation has limited effects on femoral geometric strength in older postmenopausal women: the Women's Health Initiative. *Calcif Tissue Int.* 2011 Jan 22; 88(3):198-208. [PMID: 21253715]
55. Gomez-Rubio P, Roberge J, Arendell L, Harris RB, O'Rourke MK, **Chen Z**, Cantu-Soto E, Meza-Montenegro MM, Billheimer D, Lu Z, Klimecki WT. Association between body mass index and arsenic methylation efficiency in adult women from southwest U.S. and northwest Mexico. *Toxicol Appl Pharmacol*. 2011 Apr 15; 252(2):176-82. [PMID: 21320519]
56. Robinson-Cohen C, Katz R, Hoofnagle AN, Cauley JA, Furberg CD, Robbins JA, **Chen Z**, Siscovick DS, Boer IHD, Kestenbaum B. Mineral Metabolism Markers and the Long-Term Risk of Hip Fracture: The Cardiovascular Health Study. *J Clin Endocrinol Metab*. 2011 Apr 20. (Epub ahead of print). [PMID: 21508146]
57. He W, Zhu F, Ma X, Zhao X, Zheng M, **Chen Z**, Heymsfield SB, Zhu S. Actinic Skin Damage and Mortality—the First National Health and Nutrition Examination Survey Epidemiologic Follow-up Study. PLoS ONE 2011 6(5): e19907. doi:10.1371/journal.pone.0019907
58. **Chen Z**, Qi L, Beck T, Robbins J, Wu G, Lewis C, Cauley J, Wright N, Seldin M. Stronger Bone Correlates with African Admixture in African American Women. *Journal of Bone and Mineral Research* 2011, 26(9):2307-3316. PMC ID of: 21590740

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60. Reiner AP, Lettre G, Nalls MA, Ganesh SK, Mathias R, Austin MA, Dean E, Arepalli S, Britton A, **Chen Z**, Couper D, Curb JD, Eaton CB, Fornage M, Grant SFA, Harris TB, Hernandez D, Kamatini N, Keating BJ, Kubo M, LaCroix A, Lange LA, Liu S, Lohman K, Meng Y, Mohler ER, Musani S, Nakamura Y, O'Donnell CJ, Okada Y, Palmer CD, Papanicolaou G, Patel K, Singleton AB, Takahashi A, Tang H, Taylor HA, Taylor K, Thomson C, Yanek LR, Yang L, Ziv E, Zonderman AB, Folsom AR, Evans MK, Liu Y, Becker DM, Snively BM, Wilson JG. Genome-wide association study of white blood cell count in 16,388 African Americans: the Continental Origins and Genetic Epidemiology Network. PLoS Genet 2011. 7(6): e1002108. doi:10.1371/journal.pgen.1002108.
61. Farr, J.N., Funk, J.L., **Chen, Z**., Lisse, J.R., Blew, R.M., Lee, V.R., Laudermilk, M., Lohman, T.G., Going, S.B. Skeletal muscle fat content is inversely associated with bone strength in young girls. *Journal of Bone & Mineral Research, 2011*. 26(9) 2217-2225.
62. Eaton CB, Hochberg MC, Assaf A, Cryer BL, Lu B, Sands G, Rodriguez B, LaCroix A, Lessin L, Limacher MC, Woods NF, Connelly S, **Chen Z**. The cross-sectional relationship of hemoglobin levels and functional outcomes in women with self-reported osteoarthritis: Results from the Women's Health Initiative. *Seminars in Arthritis and Rheumatism* 2011, 41(3):406-414.
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Jackson RD, Watts N, Caralis P, Cauley JA, **Chen Z**, Greep N, LaCroix AZ, Lewis B, Mouton C, Neuner J, O'Sullivan MJ, Robbins JA, Stefanick M. Fracture Risk After Estrogen Plus Progestin Discontinuation: The Women's Health Initiative. (Oral presentation at the American Society for Bone and Mineral Research 26th Annual Meeting, October 1-5, 2004, Seattle, Washington, USA. Journal of Bone and Mineral Research, 2004, 19(supplement1): S27)

Chen Z. Project overview: Longitudinal Changes in Hip Geometry and Skeletal Muscle. (Poster presentation, September 15, 2004 AHSC Frontiers in Biomedical Research Poster Forum).

Chen Z, Cauley J, Lewis CE, LaCroix A, Beck T, Nelson DA, Going S, Sherrill D, Lohman T, Jackson RD, LeBoff M, Outwater E, Wang ZM, Heymsfield S, Wu GL, Wright N, Nicolas S, Bassford T. Hormone Interventions Lead to Favorable Changes in Hip Geometric Structure. Journal of Bone and Mineral Research, 2005, 20 (supplement 1): S173-174.

Chen Z, Wang ZM, Outwater E, Heymsfield S, Sherrill D, Lohman T, LaCroix A, Nicolas S, Wu GL, Wright N, Arendell L, Moll C, Caire G, Nelson DA, Punyanitya M, Cauley J, Lewis CE, Beck T, Nelson DA, Going S, Jackson RD, LeBoff M, Outwater E, , Bassford T, Going S. Is DXA a Useful Tool for Assessing Skeletal Muscle Mass in Older Women? Journal of Bone and Mineral Research, 2005, 20 (supplement 1): S161.

Beck T, Cauley J, Lewis CE, LaCroix A, Nelson DA, Going S, Sherrill D, Lohman T, Jackson RD, LeBoff M, Outwater E, Wang ZM, Heymsfield S, Wu GL, Wright N, Nicolas S, Bassford T, **Chen Z.** Relative to Body Weight, Obesity Reduces Femoral Neck Structural Strength in Women Participating in the Women's Health Initiative Observational Study. Journal of Bone and Mineral Research, 2005, 20 (supplement 1): S74.

Going S, **Chen Z**, Lohman T, Bassford T, Nicholas S, Wu GL, Wright N, Sherrill D, Wang ZM, LaCroix A, Heymsfield S. A comparison of Measurements for Skeletal Muscle Mass by Age and Ethnicity International Journal of Body Composition Research 2005, 3(3): 89. (Oral presentation, International Symposiums, Body Composition, September 6-9, 2005 UK).

Chen Z, Bassford T, Lohman T, Nicholas S, Wu GL, Wright N, Wang ZM, Going S, LaCroix A, Sherrill D, Heymsfield S. Body composition and physical function in a cohort of multiethnic older women --- a subgroup of the Women's Health Initiative Observational Study. International Journal of Body Composition Research 2005, 3(3): 93. (Oral presentation, International Symposiums, Body Composition, September 6-9, 2005 UK).

Chen Z, Arendell LA, Thomson CA, Bassford TI. Anemia and Fractures. Journal of Bone and Mineral Research 2006, 21 (supplement 1): S69.

Chen Z, Beck T, Lewis CE, Cauley J, LaCroix A, Sherrill D, Wu G, Nelson D, Jackson R, LeBoff M, Outwater E, Lohman T, Wang Z, Heymsfield S, Bassford T, Going S. Body Composition and Hormone Intervention Have Independent Effects on Hip Geometry. Journal of Bone and Mineral Research 2006, 21 (supplement 1): S112.

Cauley JA, Talavera G, Wu L, Wampler NS, Allison M, Barnhart J, **Chen Z,** Robbins J, Jackson RD. Clinical risk factors for fracture in minority women: The Women's Health Initiative (WHI). Journal of Bone and Mineral Research 2006, 21 (supplement 1): S69.

Robbins J, Agaki A, Kooperberg C, Cauley JA, **Chen Z**, Wactawski-Wende J, LeBoff MS, Lewis CE, Jackson R, Watts NB, Stefanick M. Risk factor for hip fracture. Journal of Bone and Mineral Research 2006, 21 (supplement 1): S55.

Wright N, Arendell L, Bassford T, Thomson C, **Chen Z**. Assessing the relationship between rheumatoid arthritis and fracture risk-results from the Women's Health Initiative Observational Study. Journal of Bone and Mineral Research 2006, 21 (supplement 1): S408.

Nicolas S, Beck T, Arendell L, Wight N, Bassford T, **Chen Z**. Wider femurs are associated with current smoking in postmenopausal women – Results from a Subgroup of the Women's Health Initiative Observational Study. Journal of Bone and Mineral Research 2006, 21 (supplement 1): S451.

Arendell LA, Chlebowski R, Aickin M, Cauley JA, Lewis CE, **Chen Z.** Bone mineral density, Gail Score and Breast Cancer Risk – Results from a subcohort in the Women's Health Initiative (WHI). Journal of Bone and Mineral Research 2006, 21 (supplement 1): S267.

Martinez ME, Jiang R, Thompson P, Jacobs ET, **Chen Z.** Relationship between markers of folate status and bone mineral density (Poster, SER 2006).

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).

Chongpison Y, Lowe KA, Going S and **Chen Z**. Using Body Mass Index (BMI) as a Proxy for Total Percent Body Fat (TPBF). (Poster, APHA annual meeting, Boston MA, Nov 4-8, 2006).

James R, Arendell L, Bruhn R, Caire G, Nicholas S, **Chen Z**. The relationship between mammographic density and bone mineral density among non-Hispanic and Hispanic White women (Poster, APHA annual meeting, Boston MA, Nov 4-8, 2006).

Chen Z, Maricic M, Aragaki AK, Mouton CP, Lopez AM, Arendell LA, Bassford T, Chlebowski RT. Fracture risk increases after cancer diagnosis in postmenopausal women: results from the Women's Health Initiative (***oral presentation***). Journal of Bone and Mineral Research 2007, 22 (supplement 1):S77.

Nelson DA, Beck TJ, Lewis CE, Bassford T, Cauley J, Leboff M, Going S, **Chen Z**. Ethnic Variations in Hip Geometry among Women at Baseline from the Women's Health Initiative (***oral presentation***). Journal of Bone and Mineral Research 2007, 22 (supplement 1):S15.

Wu G, Beck TJ, Bassford T, Cauley JA, LaCroix JA, Lewis CE, **Chen Z**. Hip Geometric Structure is Weaker in Anemic Women---Results from the Women's Health Initiative Observational Study (***plenary poster presentation***). Journal of Bone and Mineral Research 2007, 22 (supplement 1):S123.

Wright NC, Lisse J, Beck TJ, Bassford T, LaCroix AZ, Cauley JA, Lewis CE, Going SB, **Chen Z.** Hip Geometry and Bone Fragility among Postmenopausal Women with Rheumatoid Arthritis (***poster presentation***) Journal of Bone and Mineral Research 2007, 22 (supplement 1):S439.

LaCroix AZ, Sherrill D, Beck T, Cauley J, Lewis CE, Jackson R, **Chen Z.** Hip Structural Geometry and Incidence of Osteoporotic Fractures in the Women's Health Initiative-Bone Mineral Density (WHI-BMD) cohort (***poster presentation***). Journal of Bone and Mineral Research 2007, 22 (supplement 1):S302.

Beck TJ, SB Going, **Z Chen.** Towards a weak bone phenotype: Comparisons of load normalized section modulus among women with and without fracture history in the Women's Health Initiative (***poster presentation***). Journal of Bone and Mineral Research 2007, 22 (supplement 1):S198.

Chen Z, Beck TJ, Wright N, LaCroix A, Cauley J, Lewis B, Bassford T, Leboff M, Jackson R. The effect of calcium plus vitamin D supplement on hip geometric structures---Results in the Women's Health Initiative Study (***oral presentation***). Journal of Bone and Mineral Research 2007, 22 (supplement 1):S59.

Nicholas JS, Bassford T, **Chen Z**. Lower Hip BMD among Ethnic Diverse Postmenopausal Women with Anemia – Results from a Subgroup of the Women's Health Initiative (***poster presentation***). Journal of Bone and Mineral Research 2007, 22 (supplement 1):S426.

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

Initiative Observational Study (***oral plenary poster presentation by Chen Z***). Journal of Bone and Mineral Research 2007, 22 (supplement 1):S88, S122.

Going S, Beck T, Arendell L, Cauley J, Lewis B, Bassford T, Wang Z, LaCroix A, Lohman T, **Chen Z**. Associations between Body Composition and Hip Geometry in Postmenopausal Women in the Women's Health Initiative (***plenary poster presentation).*** Journal of Bone and Mineral Research 2007, 22 (supplement 1):S122.

J.A. Cauley, A.Z. LaCroix, J.A. Robbins, J. Larson, R. Wallace, J. Wactawski-Wende, **Z. Chen**, J, McGowan, S.R. Cummings, R. Jackson. Serum Estradiol and Fracture Reduction during Treatment with Hormone Therapy: The Women's Health Initiative (Plenary Poster presentation) ASBMR 30th Annual Meeting being held September 12-16, 2008 in Montréal, Québec, Canada.

M.S. LeBoff [1], R. Garg[1], T. Beck[2], J. Cauley[3], G. Wu[4], B. Lewis[5], D. Nelson[6], A. LaCroix[7], **Z. Chen[4]** 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***).

Wang ZM, Pi-Sunyer FX, Heymsfield SB, Zhu S, **Chen Z**, Pierson RN Jr. Soft-tissue R values in dual-energy X-ray absorptiometry: Validation by human elemental composition. North American Association for the Study of Obesity, 2008. Obesity 2008; 16:S123.

Chen Z, Lihong Qi, Tom Beck, John Robbins, Guanglin Wu, Beth Lewis, Jane Cauley, Wright N, Seldin MF Percent of African Ancestry is Significantly Related to Hip Geometric Structures. (Presented at the American Society for Bone and Mineral Research Annual Meeting, Denver, September 10-15, 2009)

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).

Chen Z. Advancement in Clinical Utility of Body Composition Measurements (**Invited Keynote Speaker**). The 8th International Body Composition Meeting, Hangzhou, Zhejiang, China, May 2011.

Chen Z, Nicole Wright, Jennifer W. Bea, Walt Klimecki, Chengcheng Hu, Andriene Grant, Kamal Masaki, Linhong Qi, Jean Wactawskiwende, Matthew Allison, Patty Thompson. Blood circulated catabolic and anabolic biomarkers associated with skeletal muscle mass in Hispanic and Non-Hispanic postmenopausal women---an ancillary study of the Women's Health Initiative. American Society for Bone and Mineral Research Annual Meeting, Minneapolis, October 12-15, 2012 (Oral Presentation)

Chen Z, Peng Jiang, Chengcheng Hu, Leslie Arendell, John Robbins and Samy Missoum. The Incorporation of Support Vector Machines and Hip Geometric Structure Assessments in the Development of Hip Fracture Risk Prediction Model. American Society for Bone and Mineral Research Annual Meeting, Minneapolis, October 12-15 2012 (Poster Presentation).

2013 **Zhao Chen**, Andriene Grant, Walt Klimecki, Nicole C. Wright, Jennifer Bea, Scott Going, J. Skye Nicholas, Patricia Thompson. Possible pathways for the association of appendicular skeletal muscle mass with leptin, insulin, myoglobin and inflammatory markers (poster presentation). The American Society for Bone and Mineral Research Annual Meeting, Oct 2-7, 2013. Baltimore, Maryland USA.

2013 Samy Missoum, Peng Jiang, Chengcheng Hu, Skye Nicholas, **Zhao Chen**. Towards Hip Fracture Prediction using Finite Element analysis and Machine Learning (poster presentation). The American Society for Bone and Mineral Research Annual Meeting, Oct 2-7, 2013. Baltimore, Maryland USA.

2013 Yann Klimentidis, Patricia Thompson, Walter T. Klimecki, Chengcheng Hu, Guanglin Wu, Jennifer Wright Bea, Skye Nicholas, CHARGE Consortium Musculoskeletal Working Group, **Zhao Chen** Genetic variants in *CAPN3* and *ACVR2B* are associated with lean body mass in postmenopausal women. (poster presentation) The American Society for Bone and Mineral Research Annual Meeting, Oct 2-7, 2013. Baltimore, Maryland USA.

2013 Jiang, P., Missoum, S., Hu, C., and Chen, Z., "Optimal Parameter Selection of an SVM Model: Application to Hip Fracture Risk Prediction", *AIAA-2013-1935. Proceedings of the 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Boston, MA,* 2013.

2013 Jennifer H. Stern, Andriene S. Grant, Cynthia A. Thomson, Robert Kaplan, Todd M. Manini, Charles Eaton, Lesley Tinker, Erin S. LeBlanc, Scott B. Going, Oleg Zaslavsky, **Zhao Chen**. Baseline serum markers of adiposity driven immune/endocrine perturbations are not significantly correlated with longitudinal changes in lean mass in postmenopausal women (poster presentation). The American Society for Bone and Mineral Research Annual Meeting, Oct 2-7, 2013. Baltimore, Maryland USA.

2013 Zhao Chen (invited speaker) 21□ □ □ □ □ □ □ □ □ □ □ □ □ --The summit of 21st Century Anthropology in China. Beijing, China, Oct 12-13, 2013.

2014 Association of physical activity with lower type-2 diabetes incidence is weaker in those with high genetic risk. Y.C. Klimentidis, Z. Chen, A. Arora, C. Hsu. Poster presented at the American Society of Human Genetics annual meeting. October, 2014.

2014 Jiang, P., Chen, Z., and Missoum, S., "**Hip Fracture Prediction using Finite Element Modeling and Machine Learning**", *Proceedings of the 7th World Congress of Biomechanics, Boston, MA, Jul. 6 - 11*, 2014.

2014 Jiang, P., Missoum, S., and Chen, Z., "**A hybrid risk model for hip fracture prediction using clinical and stochastic finite element data**", *Summer Biomechanics, Bioengineering, and Biotransport Conference, Snowbird, Utah, June 17-20*, 2015.

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

2016 Organize, host and present at the first symposium of Chinese martial arts in Confucius Institutes--- current status and future needs, Tucson, Arizona April 11, 2016.

2017 Organize, co-host and present at the symposium on Chinese Traditional Culture and Chinese Martial Arts at the US 10th National Chinese Language Conference, Houston, Texas, April 6& 7, 2017.

WORK IN PROGRESS

- **Peer-reviewed Manuscripts Submitted**

Associations between ACE-inhibitors and angiotensin receptor blockers, and lean body mass in community dwelling older women. Bea JW, Smoller S, Wertheim BC, Klimentidis YC, **Chen Z**, Zaslavsky O, Manini T, Womack C, Kroenke C, Lacroix A, Thomson CA. Journal of Aging Research (Nov 21, 2017)

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)**

July 9-15, 2008. The 8th International Symposium on In-vivo body composition studies.

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.

November 21-25, 2008. Gerontological Society of America. Symposium: Sarcopenia. Co-chair and presenter, **Chen Z.**
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 World Health News Today. Featured on August 5, 2008

2008 Interview with World Health News Today. Featured on August 5, 2008

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,** Carroll T, Tomasa L. Finding the Perfect Balance of Strength and Safety: Falls Prevention Taken Seriously (August 19, 2004, AzGEC, Geriatric Grand Rounds).

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.

1994 **Chen Z**. The relationship of body composition and bone mineral density in healthy postmenopausal women. Annual meeting of the American Association of Physical Anthropology, Las Vegas.

1995 **Chen Z**. Nutrition and bone mass in healthy postmenopausal women. Annual Meeting of the American Association of Clinical Nutrition, San Diego.

1997 **Chen Z**. What do primary care physicians want on a DEXA report. Third Annual Meeting of the International Society for Clinical Densitometry, San Diego.

1997 **Chen Z.** Comparison of A-P and Lateral Spine DEXA in Osteoporosis. Third Annual Meeting of the International Society for Clinical Densitometry, San Diego.

1998 **Chen Z.** Comparative Findings in Bone Mineral Density among Postmenopausal Native American Woman and Postmenopausal White Women Residing in Arizona. The Annual Meeting of the American Society of Bone Mineral Research, San Francisco.

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.** Comparison of Bone Mineral Density among Elderly People using Single Photon and Peripheral Dual-Energy X-Ray Absorptiometry. 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.

1999 Maricic MJ & **Chen Z**. Quantitative Ultrasound in Pre-menopausal Women with Rheumatoid Arthritis. 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***)

2000 **Chen Z,** Marshall JR. Correction for Energy Intake in Epidemiologic Studies of Diet and Disease. Oral Presentation in a Spotlight Session at the Society for Epidemiology Research 2000 meeting in Seattle, June 15-17.

2000 **Chen Z**, Stini WA, Marshall J, Albert D. Wheat bran fiber supplementation and bone mineral density. American Society for Bone and Mineral Research 22nd Annual Meeting, September 22-26, 2000.

2001 **Chen Z**, Maskarinec G, Staten L, Marshall J. Mammographic Density and body composition among Hispanic and white postmenopausal women. American Society of Preventive Oncology Silver Anniversary Meeting, March 2001.

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).

2002 **Chen Z**, Pettinger MB, Ritenbaugh C, LaCroix AZ, Robbins J, Caan BJ, Barad DH, Hakim IA. Does Tea Drinking Affect Bone Density and Risk of Fractures among U.S. Postmenopausal Women with Different States of Hormone Replacement Therapy? (The American Society for Bone and Mineral Research 24th Annual Meeting, September 20-14, 2002).

2002 **Chen Z,** Kooperberg C, Pettinger MB, Bassford T, Cauley JA, LaCroix AZ, Lewis CE, Kipersztok S, Borne MC, Jackson RD. Validity of Self-Report of Fractures among a Postmenopausal Multiethnic Cohort---Results from the Women's Health Initiative--- (The American Society for Bone and Mineral Research 24th Annual Meeting, September 20-14, 2002).

2003 **Chen Z**, Maricic M, Bassford TL, Ritenbaugh C, Lopez AM, Leboff MS, Gass M, Barad DH. Increased Fracture Risk among Breast Cancer Survivors-Results from the Women's Health Initiative. Oral presentation at American Society for Bone and Mineral Research 25th Annual Meeting, September 21-25, 2003) (**Invited speaker to media briefing because of the significance of the findings**).

2004 **Chen Z,** Bassford T, Green S, Leboff M, Margolis K, LaCroix A, Jackson R, Cauley J, Stefanick M. Postmenopausal Hormone Therapy and Body Composition---Results from the Women's Health Initiative E + P trial. (Oral presentation at the American Society for Bone and Mineral Research 26th Annual Meeting, October 1-5, 2004, Seattle, Washington, USA).

2005 **Chen Z**, Bassford T, Lohman T, Nicholas S, Wu GL, Wright N, Wang ZM, Going S, LaCroix A, Sherrill D, Heymsfield S. Body composition and physical function in a cohort of multiethnic older women --- a subgroup of the Women's Health Initiative Observational Study (Oral presentation, International Symposiums, Body Composition, September 6-9, 2005 UK).

2005 **Chen Z,** Cauley J, Lewis CE, LaCroix A, Beck T, Nelson DA, Going S, Sherrill D, Lohman T, Jackson RD, LeBoff M, Outwater E, Wang ZM, Heymsfield S, Wu GL, Wright N, Nicolas S, Bassford T. Hormone Interventions Lead to Favorable Changes in Hip Geometric Structure (Poster presentation, American Society for Bone and Mineral Research 27th Annual Meeting, September 23-27, Nashville, TN)

2005 **Chen Z,** Wang ZM, Outwater E, Heymsfield S, Sherrill D, Lohman T, LaCroix A, Nicolas S, Wu GL, Wright N, Arendell L, Moll C, Caire G, Nelson DA, Punyanitya M, Cauley J, Lewis CE, Beck T, Nelson DA, Going S, Jackson RD, LeBoff M, Outwater E, , Bassford T, Going S. Is DXA a Useful Tool for Assessing Skeletal Muscle Mass in Older Women? (Poster presentation, American Society for Bone and Mineral Research 27th Annual Meeting, September 23-27, Nashville, TN).

2006 **Chen Z,** Arendell LA, Thomson CA, Bassford TI. Anemia and Fractures (Oral Presentation, American Society for Bone and Mineral Research 28th Annual Meeting September 15-19, 2006, Philadelphia Pennsylvania).

2006 **Chen Z,** Beck T, Lewis CE, Cauley J, LaCroix A, Sherrill D, Wu G, Nelson D, Jackson R, LeBoff M, Outwater E, Lohman T, Wang Z, Heymsfield S, Bassford T, Going S. Body Composition and Hormone Intervention Have Independent Effects on Hip Geometry (Planetary Poster Presentation, American Society for Bone and Mineral Research 28th Annual Meeting September 15-19, 2006, Philadelphia Pennsylvania).

2007 **Chen Z,** Maricic M, Aragaki AK, Mouton CP, Lopez AM, Arendell LA, Bassford T, Chlebowski RT. Fracture risk increases after cancer diagnosis in postmenopausal women: results from the Women's Health Initiative Journal of Bone and Mineral Research 2007, 22 (supplement 1):S77. American Society of Bone and Mineral Research 29th Annual Meeting, September 16-19, 2007, Honolulu, Hawaii. (*oral presentation*).

2007 **Chen Z,** Beck TJ, Wright N, LaCroix A, Cauley J, Lewis B, Bassford T, Leboff M, Jackson R. The effect of calcium plus vitamin D supplement on hip geometric structures--- Results in the Women's Health Initiative Study Journal of Bone and Mineral Research 2007, 22 (supplement 1):S59. American Society of Bone and Mineral Research 29th Annual Meeting, September 2007, 16-19, Honolulu, Hawaii. (*oral presentation*).

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

2008 **Chen Z**. Sarcopenia Interstudy Workgroup (Invited Speaker). Sarcopenia Conference. Baltimore, August 29, 2008

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

2009 **Chen Z**. Body composition and human adaptation (invited speaker) July 28-31, 2009. The 16th Congress of the International Union of Anthropological and Ethnological Science. Kunming, China

2011 **Chen Z**. Body Composition Assessment: Increased Utility at Clinical and Research Settings (Invited Speaker). IBC-2011The 9th International Symposium on In Vivo Body Composition Studies. May 21-24, 2011. Hangzhou, China.

2011 **Chen Z.** The Opportunities and Challenges in Anthropologic Research (Invited Speaker). Chinese Society for Anatomical Sciences Annual Meeting, August 8-10, 2011, Guiyang, Guizhou, China.

2011 **Chen Z.** Serum Catabolic and Anabolic Biomarkers Associated with Sarcopenia (Invited Speaker). Department of Public Health, Indiana University, Indianapolis. Sept 29, 2011.

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 35% effort as the Director (UA
learning Chinese language and culture in Arizona. Matching, not on the grant)

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 4% yr1-2, 5% yr3, 8% yr4-5
Lesions in Persons at Risk for Knee OA $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 10% years 1-5
disease risk in postmenopausal women $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

NCI $200,000
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 10%
of data from the Women's Health Initiative (WHI) Direct: $242,947; Total: $168,464
including existing DXA Images
Co-investigator

R01 NIH (Yann Klimentidis PI) 7/1/2017—6/30/2021
Genetic Risk Factors and Mechanisms 3%
Underlying Lipedema Direct: $650,000
Co-investigator

R01
NIH (Z CHEN) 9/1/2016-8/31/2021 10%
Risk factors for poor physical function, $3284,491
low muscle strength and frailty in older
Tibetans living at high altitudes

R21 AR068022
NIAMS/NIH (Z CHEN) 4/1/2015-3/31/2017 10%
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 $1,050,000($1,590,750)
(SWEHSC) $5,250,000($7,953,750)
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 $612,099 (first year total)
to Sarcopenia in Older Women $3,049,243 (total)
PI
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%
A New Hip Fracture Risk Prediction Tool $165,623 (First Year TOTAL)
Based on Common Predictors and Hip $357,982 (total)
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 $3,207,716 (Total direct)
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 $1,731,411 (Direct)
and Skeletal Muscle $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

RO1 CA78802 (GIULIANO) 7/1/99-6/30/04 1%
NIH/NCI $144,260
Four Corners Collaborative Case-Control Study
Co-investigator

R03CA105948-01 (MASKARINEC) 09/01//03 – 09/01/05 1%
NIH/NCI Small Grants Program for Epidemiology $100,000 (direct costs)
Breast Density, IGF-I, & Prolactin in Four Populations
Co-investigator

DAMS 17-02-1-02721 July 02- June 05 1%
Department of Defense (ARENDELL) $65,498
Relationship between Mammographic Density
and IGF Levels among Hispanic and Non-Hispanic
White Women
Mentor

NIH-2R01-AR39559-04A3 (BASSFORD) 10/1/94 - 9/14/2005 1%
NIH $12,000,000
Women' s Health Initiative (WHI);
Vanguard Clinical Center
Co-investigator

Supplementary Grant for WHI (CHEN) 9/30/97-9/14/05 1%
NIH $20,000
Increase recruitment of Native American
Principal Investigator

NIH/NIA (1 R01 026463-01) AG (J. CAULEY) 07/01/07 – 06/30/12
Hip Strength Across the Menopausal Transition
Consultant

Pilot project funded by Arizona Center on Aging 08/30/09 -09/01/10
Reduced phosphate absorption is associated $36,667 (total)
with the development of osteoporosis in older population.
Co-PI with Xu
To investigate how absorption factors are related to risk of osteoporosis in older women.

- ***State***

Past
Core Grant (CHEN)
Arizona Arthritis Center 7/1/97 – 6/30/01 20%
Interdisciplinary Program for Osteoporosis Research $60,000
PI

Foreign Travel Grant (CHEN)
University of Arizona International Affairs 3/25/99-4/5/99
Foreign Travel Grant to the $500

Third International Congress of Osteoporosis

- ***Industry***

Past

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

- ***Private Foundation***

Past

The Susan G. Komen Breast Cancer Foundation (CHEN) The Association between Mammographic Density and Bone Mineral Density among White and Hispanic Women PI	3/1/2001-10/31/2004 $249,924 (Total)	10%
Eli Lilly and Company (CHEN) Bone Density and Breast Cancer Risk PI	12/15/05 ---12/14/06 $78,880	5%
The Susan G. Komen Breast Cancer Foundation (C. THOMSON) Green Tea Intervention for Weight Gain Prevention among Women with Breast Cancer Co-investigator	5/15/04 – 7/15/06 $248,988 (Total)	2%

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) Zouhe 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 Summer CPH 596n Internship Preparation Class (director, 4 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 (NIEHA T32 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)

Cheryl LaCasse	(Nursing Ph.D., doctoral committee member)
Juliana Pugmire	(Epi MPH, academic advisor)
Raysenia James	(Epi MPH, academic advisor)
Bonny Weed	(Epi MPH, academic advisor)
Katie Holton	(Epi MPH, academic advisor)
Michelle Gamber	(Epi MPH, academic advisor)
Sonia Fankem	(Epi MPH, internship committee chair)
Roberta Bruhn	(Doctoral dissertation committee chair)

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)
Roberta Bruhn	(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)
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.

<u>2008-2009</u>

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)

<u>2009-2010</u>

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)

Andriene Grant	(EPI PhD, academic advisor, Fulbright scholar from Jamaica) (International student)
Josh Farr	(PhD, doctoral committee member. Physiological sciences)
Timothy Krone	(EPI MPH, academic advisor)
Katelyn Galloway	(EPI MPH, academic advisor)
Kyle Mckeown	(EPI MPH, academic advisor)
Martin, Brittany	(EPI MPH, academic advisor)
Xiao (Lucy) Chen	(EPI MPH, academic advisor)
Yee Tchao	(EPI MPH, academic advisor)

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)

<u>2011-2012</u>

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 LaCasse	(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
  - Extent of Teaching – Determined by Div. Dir. & Exec. Comm.
  - 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
    MPH in EPI. Now at American University in Washington DC. Nichole

Wright, PHD, is assistant professor at the University of Alabama, Birmingham.

CURRICULUM VITAE

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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

2007 – 2008 Postdoctoral Research Assistant, Spatial Ecology and Epidemiology Research Group, Department of Zoology, Oxford, UK

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 McColgan Grant-in-Aid, "Wetland Types: Hyperspectral Image Analysis and Mosquito Sampling," Northeast Mosquito Control Association annual conference, Northhampton, MA

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

Refereed Journal Articles (*denotes dissertation work; **denotes student mentored)

1. Helmbrecht, G.D., Farhat, M.Y., Lochbaum, L., **Brown, H.E.,** Yadgarova, K.T., Eglinton G.S., and Ramwell, P.W. "L-Arginine reverses the adverse pregnancy changes induced by Nitric Oxide Syntase inhibition in the rat." *American Journal of Obstetrics and Gynecology*. 1996, 175 (4pt1):800-805.
2. Eden, G.F., Joseph, J.E., **Brown, H.E.,** Brown, C.P., and Zeffiro, T.A. "Utilizing hemodynamic delay and dispersion to detect fMRI signal change without auditory interference: the BIG technique." *Magnetic Resonance in Medicine*. 1999, 41(1):13-20.
3. *Diuk-Wasser, M.A., **Brown, H.E.,** Andreadis, T.G., and Fish, D. "Modeling the spatial distribution of mosquito vectors for West Nile virus in Connecticut, USA." *Vector-Borne and Zoonotic Diseases*. 2006, 6(3):283-95.
4. ***Brown, H.,** Diuk-Wasser, M.A., Guan, Y., Caskey, S., and Fish, D. "Comparison of three satellite sensors at three spatial scales to predict larval mosquito presence in CT Wetlands." *Remote Sensing of the Environment*. 2008, 112(5): 2301-2308.

5. ***Brown, H.E.,** Diuk-Wasser, M.A., Andreadis, T.G., and Fish, D. “Remotely-Sensed Vegetation Indices Identify Mosquito Clusters of West Nile Virus Vectors in an Urban Landscape in the Northeastern United States.” *Vector-borne and Zoonotic Diseases*. 2008, 8(2): 197-206.
6. ***Brown, H.E.,** Paladini, M., Kline, D., Barnard, D., and Fish, D. “Effectiveness of mosquito traps in measuring species abundance and composition.” *Journal Medical Entomology*. 2008, 45(3): 517-521.
7. ***Brown, H.E.,** Childs, J.E., Diuk-Wasser, M.A., and Fish, D. “Ecological factors associated with West Nile virus transmission, northeastern United States.” *Emerging Infectious Diseases*. 2008, 14(10): 1539-1545.
8. Purse, B.V., **Brown, H.E.,** Harrup, L., PPC Mertens, and Rogers D.J., “Invasion of bluetongue and other orbivirus infections into Europe: the role of biological and climatic processes.” *Revue scientifique et technique*. 2008, 27(2): 427-442.
9. Hartemink, N., Purse, B.V., Meiswinkel, R., **Brown, H.E.,** de Koeijer, A., Elbers, A.R., Jan Boender, G., Rogers, D.J., and Heesterbeek, H. “Mapping the basic reproduction number (R_0) for vector-borne diseases: A case study on bluetongue virus.” *Epidemics*. 2009, 3(1): 153-161.
10. **Brown, H.E.,** Ettestad, P., Reynolds, P., Brown, T., Hatton, E., Holmes, J., Glass, G., Gage, K., and Eisen, R. “Climatic predictors of the intra- and inter-annual distributions of plague cases in New Mexico based on 29 years of animal-based surveillance data.” *American Journal of Tropical Medicine and Hygiene*. 2010, 82(1): 95-102.
11. **Brown, H.E.,** Yates, K., Dietrich, G., MacMillan, K., Graham, C.B., Reese, S.M., Helterbrand, W.S., Nicholson, W.L., Blount, K., Mead, P., Patrick, S.L., and Eisen, R.J. “An acarological survey and *Amblyomma americanum* distribution map with implications for tularemia risk in Missouri.” *American Journal of Tropical Medicine and Hygiene*. 2011, 84(3): 411-419.
12. Cox, J., **Brown, H.E.,** and Rico-Hesse, R. “Variation in vector competence for dengue viruses does not depend on mosquito midgut binding affinity.” *PLoS Neglected Tropical Diseases*. 2011, 5(5): e1172.
13. **Brown, H.E.,** Doyle, M.S., Cox, J., Eisen, R.J., and Nasci, R.S. “The effect of spatial and temporal subsetting on *Culex tarsalis* abundance models - a design for the sensible reduction of vector surveillance.” *Journal of the American Mosquito Control Association*. 2011, 27(2): 120-128.
14. **Brown, H.E.,** Levy, C.E., Enscore, R.E., Schriefer, M.E., DeLiberto, T.J., Gage, K.L., and Eisen, R.J. “Annual seroprevalence of *Yersinia pestis* in coyotes as predictors of interannual variation in reports of human plague cases in Arizona, USA.” *Vector-Borne and Zoonotic Diseases*. 2011, 11(11): 1439-1446.
15. Borchert, J.N., Eisen, R.J., Holmes, J.L., Atiku, L.A., Mpanga, J.T., **Brown, H.E.,** Graham, C.B., Babi, N., Montenieri, J.A., Enscore, R.E., and Gage, K.L. “Evaluation and Modification of Off-Host Flea Collection Techniques Used in Northwest Uganda: Laboratory and Field Studies.” *Journal of Medical Entomology*. 2012, 49(1): 210-214.
16. Sedda, L., **Brown, H.E.,** Purse, B.V., Burgin, L., Gloster, J., and Rogers, D.J. “A new algorithm quantifies the roles of wind and midge flight activity in the bluetongue epizootic in North-West Europe.” *Proceedings of the Royal Society Biology*. 2012, 279: 787-793. doi:10.1098/rspb.2011.2555.
17. **Brown, H.E.**, Harrington, L.C., Kaufman, P.E., McKay, T., Bowman, D.D., Nelson, C.T., Wang, D., and Lund, R. “Key Factors Influencing Canine Heartworm, *Dirofilaria immitis*, in the United States.” *Parasites Vectors*. 2012, 5:245. doi: 10.1186/1756-3305-5-245
18. Wang, D., Bowman, D.D., **Brown, H.**, Harrington, L.C., Kaufman, P.E., McKay, T., Nelson, C.T., Sharp, J.L., and Lund, R. “Factors Influencing U.S. Canine Heartworm (*Dirofilaria immitis*) Prevalence.” *Parasites Vectors*. 2014, 7(264). doi:10.1186/1756-3305-7-264.
19. Sedda, L., Morley, D., and **Brown, H.E. “**Characteristics of wind-infective farms of the 2006 Bluetongue Serotype 8 epidemic in Northern Europe” *EcoHealth.* 2015, 12(3): 461-7. doi: 10.1007/s10393-014-1008-x.

20. **Clark, R., Taylor, A., Garcia, F., Krone, T. and **Brown, H.E.** "Recognizing the role of skunks in human and animal rabies exposures" *Vector-Borne Zoonotic Diseases.* 2015, 15(8): 494-501. doi: 10.1089/vbz.2014.1719.
21. Nsoesie, E.O., Ricketts, P., **Brown, H.E.**, Fish, D., Durham, D.P., Mbah, M.L.N., Trudy, C., Ahmed, S., Marcellin, C., **Shelly, E., Owers, K., Wenzel, N., Galvani, A.P., and Brownstein, J.S. "Spatial and Temporal Clustering of Chikungunya Virus Transmission in Dominica" *PLoS Neglected Tropical Diseases.* 2015, 9(8):e0003977. doi:10.1371/journal.pntd.0003977.
22. **Brown, H.E.**, Young, A., Lega, J., Andreadis, T.G., Schurich, J., and Comrie, A. "Projection of climate change influences on U.S. West Nile virus vectors" *Earth Interactions.* 2015, 19:1-18. doi: EI-D-15-0008.1
23. **Shelly, E., Ernst, K., Sterling, C., Acuna-Sota, R., and **Brown, H.E.** "A critical assessment of officially reported Chagas disease surveillance data in Mexico" *Public Health Reports.* 2016, 131(1):59-66.
24. **Bui, D., **Brown, H.**, Harris, R., and Oren, E. "Serologic evidence for fecal-oral transmission of *Helicobacter pylori*" *American J Tropical Medicine Hygiene*. 2016, 94(1): 82-8. doi: 10.4269/ajtmh.15-0297.
25. **Haenchen, S., Hayden, M., Dickinson, K., Walker, K., Jacobs, E., **Brown, H.E.,** Gunn, J., Kohler, L., Ernst, K. "Mosquito avoidance practices and knowledge of arboviral diseases in cities with differing recent history of disease" *American J Tropical Medicine Hygiene.* 2016. 15:0732. doi:10.4269/ajtmh.15-0732.
26. Lega, J. and **Brown, H.E**. "Data-driven outbreak forecasting with a simple nonlinear growth model." *Epidemics*. 2016, 17:19-26.
27. **Brown, H.E.**, **Smith, C., **Lashway, S. "Influence of the length of storage on *Aedes aegypti* (Diptera: Culicidae) egg viability" *J Medical Entomology.* 2016, 54(2):489-491 doi: 10.1093/jme/tjw186.
28. **Hansen, V., Oren, E., Dennis, L., **Brown, H.E.** "Infectious Disease Mortality Trends in the United States, 1980-2014" *J American Medical Association*. 2016. 316(20):2149 doi:10.1001/jama.2016.12423.
29. **Reyes-Castro, P., Harris, R.B., **Brown, H.E.,** Christopherson, G. Ernst, K.C., "Spatio-temporal and neighborhood characteristics of two dengue outbreaks in two arid cities of Mexico" *Acta Tropica.* 2017, 167:174-182; doi:10.1016/j.actatropica.2017.01.001.
30. **Langston, M.E., Dennis, L.K. Lynch, C.F., Roe, D.J., **Brown, H.E**. "Temporal trends in satellite-derived erythemal UVB and implications for ambient sun exposure assessment" *International J Environmental Research and Public Health.* 2017, 14(2):E176. doi:10.3390/ijerph14020176.
31. **Brown, H.E**., Barrera, R. Comrie, A.C., Lega, J. "Effect of temperature thresholds on modeled *Aedes aegypti* population dynamics" *J Medical Entomology.* 2017, 54(4):869-877. doi: 10.1093/jme/tjx041
32. Lega, J., **Brown, H.E**., Barrera, R. "*Aedes aegypti* abundance model improved with relative humidity and precipitation-driven egg hatching" *J Medical Entomology.* 2017, 54(5):1375-1384. doi: 10.1093/jme/tjx077.
33. **Brown, H.E**., Cox, J., Comrie, A.C., Barrera, R. "Habitat and density of oviposition opportunity influences *Aedes aegypti* (Diptera: Culicidae) flight distance" *J Medical Entomology.* 2017, 54(5):1385-1389. doi: 10.1093/jme/tjx083.
34. **Murakami, T., **Scranton, R. **Brown, H.E.,** Harris, R.B., Chen, Z., Musuku, S., and Oren, E. "Management of *Helicobacter pylori* in the United States: Results from a national survey of gastroenterology physicians" *Preventive Medicine.* 2017, 100:216-222. doi: 10.1016/j.ypmed.2017.04.021.
35. **Driscoll, L.J., **Brown, H.E.**, Harris, R.B., Oren, E. "Population knowledge, attitude and practice regarding *H. pylori* transmission and outcomes: A literature review" *Frontiers in Public Health*. 2017, 5(144)1-6. doi.org/10.3389/fpubh.2017.00144.

36. **Brown, H.E.**, **Mu, W., Khan, M., Tsang, C., Liu, J., Tong, D. "Spatial scale in environmental risk mapping: A Valley fever case study" *J Public Health Research.* 2017, 6(2):886. doi: 10.4081/jphr.2017.886
37. Luz, P.M., **Johnson, R.E., **Brown, H.E.** "Workplace availability, risk group and perceived barriers predictive of 2016-17 influenza vaccine uptake in the United States: a cross-sectional study" *Vaccine.* 2017, 35(43):5890-5896. doi.org/10.1016/j.vaccine.2017.08.078
38. Del Valle, S.Y., McMahon, B.H., Asher, J., Hatchett, R., Lega, J., **Brown, H.E.,** Leany, M., Pantazis, Y., Roberts, D.J., Moore, S., Peterson, A.T., Escobar, L.E., Quio, H., Hengartner, N.W., Mukundan, H. "Summary results of the 2014-2015 DARPA Chikungunya Challenge" *BMC Infectious Disease*. 2018, 18:245. doi: 10.1186/s12879-018-3124-7.
39. **Bui, D.P., Oren, E., Roe, D.J., **Brown, H.E.,** Harris, R.B., Knight, G., Gilman, R., Grandjean, L., "A Case Control Study to Identify Community Venues Associated with Genetically Clustered Multidrug Resistant Tuberculosis Disease in Lima, Peru." *Clinical Infect Dis in press,* ciy746, https://doi.org/10.1093/cid/ciy746.
40. Isoe, J., Koch, L.E., Isoe, Y.E., Rascon, A.A., **Brown, H.E.,** Massani, B.B., Miesfeld, R.L. "Identification and characterization of the mosquito-specific eggshell organizing factor in *Aedes aegypti* mosquitoes" *PLoS Biology.* 2019
41. **Florea, A., **Brown, H.E.**, Harris, R.H., Oren, E. "Ethnic Disparities in Gastric Cancer Presentation and Screening Practice in US: Analysis of 1997-2010 SEER-Medicare Data" *Cancer Epidemiology, Biomarkers & Prevention in press*.
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.*
43. **Brown, H.E.**, Dennis, L., **Lauro, P.L., Purva, J., Pelley, E., Oren. E. "Emerging Evidence for Infectious Causes of Cancer in the United States" *Epidemiologic Reviews in press*.

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

1. Hudspeth, W., Reisen, W.K., Barker, C.M., Kramer, V., Caian, M., Craciunescu, V., **Brown, H.E.,** Comrie, A.C., Zelicoff, A., Ward, T.G., Ragain, R.M., Simpson, G., Stanhope, W., Kass-Hout, T.A., Scharl, A., Sonricker, A.L., Brownstein, J.S. to "Chapter 10: Information Support Systems," *Environmental Tracking for Public Health Surveillance*. Morain, S.A. and Budge, A.M. (eds). 2012, London: Taylor & Francis Group.
2. [+]**Brown, H.E.**, Comrie, A., Drechsler, D., Barker, C.M., Basu, R., Brown, T., Gershunov, A., Kilpatrick, A.M., Reisen, W.K., and Ruddell, D. *Review Editor: English, P.* "Chapter 15: Health Effects of Climate Change in the Southwest," *Assessment of Climate Change in the Southwest United States: a Technical Report Prepared for the U.S. National Climate Assessment.* Garfin, G., Jardine, A., Merideth, R., Black, M., and Overpeck, J. (eds.) 2013, Tucson, AZ: Southwest Climate Alliance.
3. **Brown, H.E.**, Comrie, A.C., Tamerius, J., Khan, M., Tabor, J.A., Galgiani, J.N. "Climate, windstorms, and the risk of valley fever (Coccidioidomycosis)," *The Influence of Global Environmental Change on Infectious Disease Dynamics: Workshop Summary. 2014,* Washington, DC: The National Academies Press.
4. Ernst, K.C., Morin, C., **Brown, H.E. "**Extreme Weather Events and Vector-borne Diseases," *Public Health in Natural Disasters: Nutrition, Food, Remediation and Preparation* (Watson, R.R., Tabor, J.A., Ehiri, J.E., and Preedy, V.R. (eds.) 2014, The Netherlands: Wageningen Academic Publishers.
5. [+]National Academies of Science, Engineering, and Medicine. *Review of the Draft Interagency Report on the Impacts of Climate Change on Human Health in the United States*. 2015. Washington, DC: National Academies Press.
6. Roach, M., **Brown, H.E.**, Wilder, M., Smith, G. R., Chambers, S., Patten, I. E., **Rabby, Q. (2017) *Assessment of Climate and Health Impacts on Vector-Borne Diseases and Valley Fever in Arizona.* A report prepared for the Arizona Department of Health Services and the United States Centers for Disease Control and Prevention Climate-Ready States and Cities Initiative.

http://www.azdhs.gov/preparedness/epidemiology-disease-control/extreme-weather/index.php#news-publications

7. Roach, M., Barrett, E., **Brown, H.E.**, Dufour, B., Hondula, D.M., Putnam, H., Sosa, B. (2017) *Arizona's Climate and Health Adaptation Plan.* A report prepared for the United States Centers for Disease Control and Prevention Climate-Ready States and Cities Initiative. http://www.azdhs.gov/preparedness/epidemiology-disease-control/extreme-weather/index.php#news-publications
8. Roach, M., **Brown, H.E.**, **Clark, R., Hondula, D., Lega, J., **Rabby, Q., **Schweers, N., Tabor, J. (2017) *Projections of Climate Impacts on Vector-Borne Diseases and Valley Fever in Arizona*. A report prepared for the Arizona Department of Health Services and the United States Centers for Disease Control and Prevention Climate-Ready States and Cities Initiative. http://www.azdhs.gov/preparedness/epidemiology-disease-control/extreme-weather/index.php#news-publications
9. Dennis, L.K., Lynch, C.F., **Brown, H.E.**, Laukaitis, C., **Lashway, S., Smith, E. Cancer In: Remington P (ed). Maxcy-Rosenau-Last Public Health and Preventive Medicine. New York: McGraw-Hill Medical, 16th edition. *In press.*

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

2013 "Vector-borne disease invasions: what did West Nile virus teach us?" in the Mini-Symposium: *MS29. Recent advances on modeling study of vector-borne diseases* SIAM (Society for Industrial and Applied Mathematics) Conference on the Life Sciences. Tempe, AZ

2014 "Habitat and Abundance Modeling of West Nile Virus Vector**"** in the Mini-Symposium: *MS65 Recent Advances in Ecosystems and Disease Models*. SIAM (Society for Industrial and Applied Mathematics) Conference on the Life Sciences. Charlotte, NC

2014 "Challenges and Spatial Modeling of Vector-borne disease surveillance data" on the Panel "Opportunities and Challenges in Nutrition and Global Public Health" in the *Symposium on Arid Lands, Food Security*, and Health at the Tucson Marriott University Park Hotel, Tucson, AZ

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

2017 “Southwest Climate Change Impact on Health” at the Wilderness Medical Society Desert Medicine Conference, Tucson, AZ

2017 “Transdisciplinary Network-Based Infectious Disease Modeling” 6th International Conference on Mathematical Modeling, Tucson, AZ

2018 Plenary and Panel Discussion: State of Practice, Public Health and Adaptation Issues in the SW, SW Adaptation Forum, Tucson, Arizona

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.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Lawrence University, Appleton, WI	BA	06/1997	Chemistry and Interdisciplinary Science
University of Michigan, Ann Arbor, MI	MPH	06/2001	Epidemiology
University of Michigan, Ann Arbor, MI	PhD	12/2006	Epidemiology

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

2013 Tucson Woman of the Year, Arizona Daily Star (newspaper) and Tucson Hispanic Chamber of Commerce
2016 Award for Excellence in Teaching, Mel and Enid Zuckerman College of Public Health, University of Arizona
2017 Award for Excellence in Service, Mel and Enid Zuckerman College of Public Health, University of Arizona
2017 AAAS Leshner Fellowship in Community Engagement, American Association for the Advancement of Science (AAAS)

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.

a. **Ernst, K.C.**, Adoka, S.O., Kowuor, D.O., Wilson, M.L., John, C.C. "Malaria hotspot areas in a highland Kenya site are consistent in epidemic and non-epidemic years and are associated with ecological factors." Malaria Journal, 2008, 13(5):78. PMCID: PMC1586014.
b. Schmidt CA, Comeau G, Monaghan AJ, Williamson DJ, **Ernst KC**, Effects of desiccation stress on adult female longevity in Aedes aegypti and Ae. albopictus (Diptera: Culicidae): Results of a systematic review and pooled survival analysis. 2018. Parasites & vectors 11 (1), 267 PMCID: PMC5918765
c. Reyes-Castro P, Harris R, Brown H, Christopherson G, **Ernst K**, Spatio-temporal and neighborhood characteristics of two dengue outbreaks in two arid cities of Mexico, Acta Tropica, Volume 167, Pages 1-230. PMCID: 28062233
d. **Ernst K.C.,** Walker KR, Reyes-Castro P, Joy T, Castro-Luque L, Diaz-Caravantes R, Gameros M, Haenchen S, Hayden M, Monaghan A, Riehle, MR. *Aedes aegypti* (Diptera: Culicidae) Longevity and Differential Emergence of Dengue Fever in Two Cities in Sonora, Mexico. J Med Entomol (2017) 54 (1): 204-211. PMCID: PMC5853638

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.

a. **Ernst, K.C.**, Haenchen, S., Dickinson K., Doyle, M., Monaghan, A., Walker, K., Hayden, M. Community awareness and preliminary support of the controversial release of OX513A *Ae. aegypti* in Key West, FL. Emerging Infectious Disease, (2014), 21(2):320-4. PMCID: PMC4313646
b. Haenchen, S.; Hayden, M.; Dickinson, K.; Walker, K.; Jacobs, E.; Brown, H.; Gunn, J.; Kohler, L.; **Ernst, K.C.**, Mosquito avoidance practices and knowledge of arboviral diseases in cities with differing recent history of disease. American Journal of Tropical Medicine and Hygiene. (2016) 95(4):945-953. PMCID: PMC5062805
c. **Ernst KC,** Hayden MH, Olsen H, Cavanaugh JL, Ruberto I, Agawo M, Munga S. Comparing ownership and use of bed nets at two sites with differential malaria transmission in western Kenya. Malar J. (2016) Apr 14;15(1):217. doi: 10.1186/s12936-016-1262-1.
d. **Ernst KC**, Erly S, Adusei C, Bell Melanie, Kessie David, Biritwum-Nyarko Alberta, Ehiri John. Reported bed net ownership and use in social contacts is associated with uptake of bed nets for malaria prevention in pregnant women in Ghana. 2017 Malaria J, 16(1):13. PMCID: PMC5210303

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.

a. Menge, D.M., **Ernst, K.C**., Vulule, J.M., P.A., Guo, H., John, C.C. "Microscopy underestimates the frequency of *Plasmodium falciparum* infection in symptomatic individuals in a low transmission highland area." American Journal of Tropical Medicine and Hygiene, 2008, 79 (2):173-7. {co-first author}. PMCID: PMC2590590.

b. **Ernst, K.C.**, Pogreba-Brown, K.**, Rasmussen, L., Erhart, L. "The Effect of Policy Changes on Hepatitis A Vaccine Uptake in Arizona Children (1995-2008)." Public Health Reports, 2011, July-Aug: 126: S2. PMCID: PMC3113434.

c. Haenchen, S.D.**, Jacobs, E.T., Bratton, K.N.**, Carman, A.S.**, Oren, E., Pottinger, H.E.**, Regan, J.A.**, **Ernst, K.C.** "Perceptions of Personal Belief Vaccine Exemption Policy: A Survey of Arizona Vaccine Providers." Vaccine, 2014 Jun 17;32(29):3630-5. PMID: 24814551.

d. Hayden, M.H., Cavanaugh, J., Tittel, C., Butterworth, M., Haenchen, S., Dickinson, K., Monaghan, A., **Ernst, K.C.** "Post Outbreak Review: Dengue Preparedness and Response in Key West, Florida". American Journal of Tropical Medicine and Hygiene *Am J Trop Med Hyg, 2015 Aug 5;* 93(2):397-400. PMCID: PMC4530769.

Complete list of publications can be found here:
http://www.ncbi.nlm.nih.gov/sites/myncbi/kacey.ernst.1/bibliography/44202361/public/?sort=date&direction=ascending

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 (Stacey A Missmer, ScD)	Harvard T.H. Chan School of Public Health

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

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

National

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

International

2018-	Member	World Endometriosis Society, Junior Ambassador

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

2006-2010	Dr. Thomas Dooley Pre-Health Scholarship	Davenport, Iowa Public School District	Academic Scholarship
2009	Young Women of Achievement Award	Girl Scouts of Eastern Iowa and Western Illinois and The Women's Connection	Academic and Community Service
2011-2012	Central Initiative Scholarship	Harvard T.H. Chan School of Public Health	Scholarship
2015	Society of Epidemiologic Research Travel Scholarship "*A Prospective Study of Endometriosis and Risk of Breast Cancer",* **Farland LV**, Tamimi RM, Eliassen AH, Spiegelman D, Hankinson SE, Missmer SA	Student/Post-doc Committee, Society of Epidemiologic Research	Travel Award
2015-2016	P.E.O Scholar Award	P.E.O. International	Scholarship
2016	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	National Institute of Environmental Health Sciences (NIEHS)	Travel Award

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)	Academic Award
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)	Travel Award
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)	Travel Award
2018	ASRM Scientific Program Prize Paper "Endometriosis and risk of adverse maternal and pregnancy Outcomes" **Farland LV**, Prescott J, Vlasac IM, Tobias DK, Gaskins AJ, Stuart JJ, Carusi DA, Chavarro JE, Rich-Edwards JW, Missmer SA	American Society of Reproductive Medicine (ASRM)	Award Finalist

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 HDO60454
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

2016	Advanced Reproductive Epidemiology (EPI 270) *15 masters and doctoral students*	*One 2 hour lecture / year*
2014, 15, 16, 17, 18	Gender and Health: Introductory Perspectives (WGH 211) *30 masters and doctoral students*	*One 2 hour lecture / year*
2017	Epidemiological Research in Obstetrics and Gynecology (EPI269) *20 masters and doctoral students*	Co-course Instructor *3 hours / week for 8 weeks*

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

2016, 2017	Study Design and Analysis Seminar *8-10 clinical residents and fellows*	OB/GYN Fellow Summer Research and Professional Development Sessions *Two 2 hour lectures/ year*

Formal Teaching of Students in Courses at the University of Arizona

2019	Chronic Disease Epidemiology (EPID 670) *15 masters and doctoral students*	Co-course Instructor *3 hours / week for 16 weeks*
2019	Epidemiology Spring Seminar (EPID 696A) *25 masters and doctoral students*	Instructor *1 hour / week for 16 weeks*

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*

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

1. Shammas NW, Dippel EJ, Avila A, Gehbauer L, **Farland L**, Brosius S, Jerin M, Winter M, Stoakes P, Byrd J, Majetic L, Shammas G, Sharis P, Robken J. Long-term outcomes in treating left main trifurcation coronary artery disease with the Paclitaxel-eluting stent. J Invasive Cardiol 2007 Feb; 19(2):77-82. [PMID: 17268042]

2. Shammas NW, Dippel EJ, Shammas GA, **Farland L**, Brosius S, Jerin M, Avila A, Gehbauer L, Winter M, Stoakes P, Byrd J, Sharis P, Robken J. Intermediate term outcomes with bifurcation coronary stenting using the paclitaxel drug-eluting stent: a single centre experience. Int J Angiol 2008 Summer; 17(2): 88-92.[PMID: 22477394]

3. **Farland LV**, Missmer SA, Rich-Edwards J, Chavarro J, Barbieri R, Grodstein F. Use of fertility treatment modalities in a large United States cohort of professional women. Fertil Steril 2014 June; 101(6):1705-10. [PMID: 24746739]

4. Kvaskoff M, Mu F, Terry KL, Harris HR, Poole EM, **Farland LV**, Missmer SA. Endometriosis: a high-risk population for major chronic diseases? Hum Reprod Update 2015 Jul-Aug; 21(4):500-16. [PMID: 25765863]

5. **Farland LV**, Grodstein F, Srouji SS, Forman JP, Rich-Edwards J, Chavarro JE, Missmer SA. Infertility, fertility treatment, and risk of hypertension. Fertil Steril 2015 Aug; 104(2):391-7. [PMID: 26049054]

6. Carter EB*, Stuart JJ*, **Farland LV**, Rich-Edwards JW, Zera CA, McElrath TF, Seely EW. Pregnancy complications as markers for subsequent maternal cardiovascular disease: validation of a maternal recall questionnaire. J Womens Health 2015 Sep; 24(9):702-12. [PMID:26061196]

7. Choussein S, Srouji SS, **Farland LV**, Gargiulo AR. Flexible carbon dioxide laser fiber versus ultrasonic scalpel in robot-assisted laparoscopic myomectomy. J Minim Invasive Gynecol Nov-Dec 2015; 22(7):1183-90. [PMID:26092081]

8. **Farland LV**, Rifas-Shiman SL, Gillman MW. Early pregnancy cravings, dietary intake, and development of abnormal glucose tolerance. J Acad Nutr Diet 2015 Dec; 115(12):1958-64. [PMID: 26099686]

9. Mahalingaiah S, Hart JE, Laden F, **Farland LV**, Hewlett M, Chavarro JE, Aschengrau A, Missmer SA. Adult air pollution exposure and risk of infertility in the Nurses' Health Study II. Hum Reprod 2016 Mar; 31(3):638-47. [PMID: 26724803]

10. **Farland LV**, Collier A, Correia K, Grodstein F, Chavarro J, Rich-Edwards J, Missmer SA. Who receives a medical evaluation for infertility in the United States? Fertil Steril 2016 May; 105(5):1274-80. [PMID: 26785253]

11. Goldman RH, Missmer SA, Robinson MK, **Farland LV**, Ginsburg ES. Reproductive outcomes differ following Roux-en-Y gastric bypass and adjustable gastric band compared with those of an obese non-surgical group. Obes Surg 2016 Nov; 26(11): 2581-2589. [PMID: 27052316]

12. Prescott J, **Farland LV**, Tobias DK, Gaskins AJ, Spiegelman D, Chavarro JE, Rich-Edwards JW, Barbieri RL, Missmer SA. A prospective cohort study of endometriosis and subsequent risk of infertility. Hum Reprod 2016 Jul;31(7):1475-82. [PMID: 27141041]

13. Chavarro JE, Rich-Edwards JW, Gaskins AJ, **Farland LV**, Terry KL, Zhang C, Missmer SA. Contributions of the Nurses' Health Studies to reproductive health research. Am J Public Health 2016 Sep;106(9):1669-76. [PMID: 27459445]

14. Lewis EI, Misser SA, **Farland LV**, Ginsburg ES. Public support for elective oocyte cryopreservation. Fertil Steril 2016 Oct;106(5):1183-1189. [PMID: 27473351]

15. **Farland LV**, Tamimi RM, Eliassen AH, Spiegelman D, Bertrand KA, Missmer SA. Endometriosis and mammographic density measurements in the Nurses' Health Study II. Cancer Causes and Control 2016 Oct;27(10):1229-37. [PMID: 27549771]

16. **Farland LV**, Tamimi RM, Eliassen AH, Spiegelman D, Collins L, Schnitt S, Missmer SA. A prospective study of endometriosis and risk of benign breast disease. Breast Cancer Res Treat 2016 Oct;159(3):545-52. [PMID:27604359]

17. Goldman RH, Kaser DJ, Missmer SA, Srouji SS, **Farland LV**, Racowky C. Building a model to increase live birth rate through patient-specific optimization of embryo transfer day. J Assist Reprod Genet 2016 Nov; 33(11): 1525-1532. [PMID: 27614634]

18. **Farland LV**, Tamimi RM, Eliassen AH, Spiegelman D, Hankinson SE, Chen WY, Missmer SA. The relationship between laparoscopically confirmed endometriosis and breast cancer in the Nurses' Health Study II. Obstet Gynecol 2016 Nov; 128(5):1025-1031. [PMID: 27741204]

19. Brady PC, Missmer SA, **Farland LV**, Ginsburg ES. Clinical predictors of failing one dose of methotrexate for ectopic pregnancy after in vitro fertilization. J Assist Reprod Genet 2017 Mar; 34(3):349-356. [PMID: 28058611]

20. Goldman RH, Racowsky C, **Farland LV**, Munne S, Ribustello L, Fox JH. Predicting the likelihood of live birth for elective oocyte cryopreservation: A counseling tool for physicians and patients. Hum Reprod 2017 Apr 1; 32(4):853-859. [PMID: 28166330]

21. Lee MS, **Farland LV**, Missmer SA, Ginsburg ES. Limitations on compensation of gamete donors: a public opinion survey. Fertil Steril 2017 Jun; 107(6):1355-1363. [PMID:28390693]

22. Dolinko AV, **Farland LV**, Kaser DJ, Missmer SA, Racowsky C. National Survey on use of time-lapse imaging systems in IVF laboratories. J Assist Reprod Genet. 2017 Jun 10 [Epub ahead of print]. [PMID:28600620]

23. Lewis EI, Farhadifar R, **Farland LV**, J Needleman D, Missmer SA, Racowsky C. Use of imaging software for assessment of the association among zona pellucida thickness variation, assisted hatching, and implantation of day 3 embryos. J Assist Reprod Genet. 2017 Jul 6 [Epub ahead of print]. [PMID: 28685392]

24. Choussein S, Srouji SS, **Farland LV**, Wietsma A, Missmer SA, Hollis M, Yu RN, Pozen CN, Gargiulo AR. Robotic assistance confers ambidexterity to laparoscopic surgeons. J Minim Invasive Gynecol. 2017 Jul 19. pii: S1553-4650(17)30397-7. [PMID:28734971]

25. Insogna IG, **Farland LV**, Missmer SA, Ginsburg EG, Brady PC. Outpatient endometrial aspiration: an alternative to methotrexate for pregnancy of unknown location. Am J Obstet Gynecol 2017 Aug; 217(2):185.e1-185.e9. [PMID: 28433735]

26. **Farland LV**, Missmer SA, Bijon A, Gusto G, Gelot A, Clavel-Chapelon F, Mesrine S, Boutron-Ruault MC, Kvaskoff M. Associations among body size across the life course, adult height, and endometriosis. Hum Reprod 2017 Aug 1;32(8):1732-1742. [PMID: 28591798]

27. Kaser DJ, **Farland LV,** Missmer SA, Racowsky C. Prospective study of automated versus manual annotation of early time-lapse markers in the human preimplantation embryo. Hum Reprod. 2017 Aug 1;32(8):1604-1611. [PMID: 28854587]

28. Kaser DJ, Bormann CL, Missmer SA, **Farland LV,** Ginsburg ES, Racowsky C. A pilot randomized controlled trial of Day 3 single embryo transfer with adjunctive time-lapse selection versus Day 5 single embryo transfer with or without adjunctive time-lapse selection. Hum Reprod. 2017 Aug 1;32(8):1598-1603. [PMID: 28854588]

29. **Farland LV,** Lorrain S, Misser SA, Dartios L, Cervenka I, Savoye I, Mesrine S, Boutron-Ruault MC, Kvaskoff M. Endometriosis and risk of skin cancer a prospective cohort study. Cancer Causes Control. 2017 Oct;28(10):1011-1019. [PMID:28799019]

30. **Farland LV**, Eliassen AH, Tamimi RM, Spiegelman D, Michels K, Missmer SA. History of breast feeding and risk of incident endometriosis: prospective cohort study. BMJ. 2017. Aug 29;358:j3778. [PMID:28851765]

31. Goldman RH, Kaser DJ, Missmer SA, **Farland LV**, Scout S, Ashby RK, Ginsburg ES. Fertility treatment in the transgender community: a public opinion study. J Assist Reprod Genet. 2017 Nov;34(11):1457-1467. [PMID: 28900753]

32. **Farland LV,** Mu F, Eliassen AH, Hankinson SE, Tworoger SS, Barbieri RL, Dowsett M, Pollack MN, Missmer SA. Menstrual cycle characteristics and steroid hormone, prolactin, and growth factor levels in premenopausal women. Cancer Causes Control. 2017 Dec;28(12):1441-1452. [PMID: 29086892]

33. Bortoletto P, **Farland LV**, Ginsburg ES, Goldman RH. Public Support for intergenerational oocyte donation in the United States. Fertil Steril 2018 Feb; 109(2): 343-348. [PMID: 29246558]

34. Brady PC, **Farland LV**, Missmer SA, Racowsky C, Fox JH. Abnormal human gonadotropin (hCG) trends after transfer of multiple embryos resulting in viable singleton pregnancies. J Assist Reprod Genet. 2018 Mar; 35(3):486-489. [PMID: 29260358]

35. Murugappan G, **Farland LV**, Missmer SA, Correia KF, Anchan RM, Ginsburg ES. Gestational carrier in assisted reproductive technology. Fertil Steril. 2018 Mar;109(3):420-428. [PMID: 29428314]

36. Dolinko AV, **Farland LV**, Missmer SA, Srouji SS, Racowsky C, Ginsburg ES. Responses to fertility treatment among patients with cancer: a retrospective cohort study. Fertil Res Pract. 2018 Apr 17;4:3. [PMID: 29692923]

37. Sacha CR, Kaser DJ, **Farland LV**, Srouji S, Missmer SA, Racowsky C. The effect of short-term exposure of cumulus-oocyte complexes to in vitro maturation medium on yield of mature oocytes and usable embryos in stimulated cycles. J Assist Reprod Genet. 2018 May;35(5):841-849. [PMID: 29536383]

38. Kaser DJ, Bogale B, Sarda V, **Farland LV**, Williams PL, Racowsky C. Randomized controlled trial of low (5%) versus ultralow (2%) oxygen for extended culture using bipronucleate and tripronucleate human preimplantation embryos. Fertil Steril. 2018 Jun;109(6):1030-1037.e2.

[PMID: 29935641]

39. Romanski PA, Carusi DA, **Farland LV**, Missmer SA, Kaser DJ, Walsh BW, Racowsky C, Brady PC. Perinatal and Peripartum Outcomes in Vanishing Twin Pregnancies Achieved by In Vitro Fertilization. Obstet Gynecol. 2018 Jun;131(6) 1011-1020. [PubMed PMID: 29742658]

40. **Farland LV**[*], Shafrir AL[*], Shah DK, Harris HR, Kvaskoff M, Zondervan K, Missmer SA. Risk for and consequences of endometriosis: A critical epidemiologic review. Best Pract Res Clin Obstet Gynaecol. 2018 Aug;51:1-15. [PMID: 30017581]

41. Romanski PA, Goldman RH, **Farland LV**, Srouji SS, Racowsky C. The association between quality of supernumerary embryos in a cohort and implantation potential of the transferred blastocyst. J Assist Reprod Genet. 2018 Sep;35(9):1651-1656. [PMID: 29974298]

42. Goldman RH, Racowsky C, **Farland LV**, Fox JH, Munné S, Ribustello L, Ginsburg ES. The cost of a euploid embryo identified from preimplantation genetic testing for aneuploidy (PGT-A): a counseling tool. J Assist Reprod Genet. 2018 Sep;35(9):1641-1650. [PMID: 30066304]

43. Bortoletto P, Hariton E, **Farland LV**, Goldman RH, Gargiulo AR. Uterine Transplantation: A Survey of Perceptions and Attitudes of American Reproductive Endocrinologists and Gynecologic Surgeons. J Minim Invasive Gynecol. 2018 Sep-Oct; 25(6):974-979. [Epub ahead of print]. [PMID: 29501812]

44. Hariton E, Bortoletto P, Goldman RH, **Farland LV**, Ginsburg ES, Gargiulo AR. A Survey of Public Opinion in the United States Regarding Uterine Transplantation. J Minim Invasive Gynecol. 2018 Sep-Oct; 25(6):980-985. [PMID: 29524724]

45. Brady PC, **Farland LV**, Ginsburg ES. Serum Human Chorionic Gonadotropin Among Women With and Without Obesity After Single Embryo Transfers. J Clin Endocrinol Metab. 2018 Nov 1;103(11):4209-4215. [PubMed PMID:30137414

Peer reviewed publications in print or other media

Commentary

1. **Farland LV**, Correia KF, Wise LA, Williams PL, Ginsburg ES, Missmer SA. P-values and Reproductive Health: What can clinical researchers learn from the American Statistical Association? Hum Reprod. 2016 Nov; 31 (11): 2406-2410. [PMID: 27664212].

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

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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

- Dissertation: *Advances in Pedigree Analysis: Hardy-Weinberg Equilibrium, Maternal Effects, and Strain Imputation*
- 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
Poenix, AZ

Honors And Awards

Dissertation Year Fellowship 2009
University of California, Los Angeles University of California

Travel Award and Stellar Abstract Award 2012
Program in Quantitative Genomics, Harvard University

Travel Award 2012
14th Meeting of New Researchers in Statistics and Probability, University of California San Diego

New Investigator Award 2016
2016 SRCOS Summer Research Conference

Publications

Peer Review Journal

2005

1. G.-G. Yan, A. L. B. Yang, and **J. J. Zhou**, The Zrank conjecture and restricted Cauchy matrix. *Linear Algebra and its Applications.* (2005) 411: 371-385.

2006

2. J. Zeng and **J. J. Zhou**, Applications of Waring's formula to some identities of Chebyshev polynomials. *Fibonacci Quarterly* (2006) 44.2: 117-120.

3. J. Zeng and **J. J. Zhou**, A q-analog of the Seidel generation of Genocchi numbers. *European Journal of Combinatorics.* (2006) 27: 364-381.

2009

4. **J. J. Zhou**, K. Lange, J. C. Papp and J. S. Sinsheimer, A heterozygote-homozygote test of hardy-weinberg equilibrium. *European Journal of Human Genetics.* (2009) 17(11): 1495-1500.

5. C. G. S. Palmer, J. T. Lueddeke, **J. J. Zhou**, Factors influencing parental decision about genetics evaluation for their deaf or hard-of-hearing child. *Genetics in Medicine.* (2009) 11(4): 248-55.

6. C. G. S. Palmer, A. Martinez, M. Fox, **J. J. Zhou**, N. Shapiro, Y. Sininger, W. W. Grody, L. A. Schimmenti, A prospective, longitudinal study of the impact of GJB2/GJB6 genetic testing on the beliefs and attitudes of parents of deaf and hard-of-hearing infants. *American Journal of Medical Genetics.* (2009) 149A (6): 1169-1182.

2010

7. P. Boudreault, E. E. Baldwin, M. Fox, L. Dutton, L. Tullis, J. Linden, Y. Kobayashi, **J. J. Zhou**, J. S. Sinsheimer, Y. Sininger, W.W. Grody, C. G. S. Palmer, Deaf adults' reasons for genetic testing depend on cultural affiliation: results from a prospective, longitudinal genetic counseling and testing study. *Journal of Deaf Studies and Deaf Education.* (2010) 15(3): 209-7.

2011

8. **J. J. Zhou**, S. Pelka, K. Lange, C. G. S. Palmer and J. S. Sinsheimer, Dissecting prenatal, postnatal environmental effects and maternal inherited effects: ART and design. *Genetic Epidemiology.* (2011) 35: 437-446.

9. Y. Tong, **J. J. Zhou**, J. Mizutani, H. Fukuoka, S. Ren, A. Gutierrez-Hartmann, H. P. Koeffler and S. Melmed, CEBPD suppresses prolactin expression and prolactinoma cell proliferation. *Molecular Endocrinology.* (2011) 25: 1880-1891.

2012

10. **J. J. Zhou**, A. Ghazalpour, J. S. Sinsheimer E. M. Sobel, K. Lange, QTL association mapping by imputation of strain origins in multifounder crosses. *Genetics.* (2012) 190: 1-15.

11. Y. Tong, Y. Zheng, **J. J. Zhou**, N. M. Oyesiku, H. P. Koeffler and S. Melmed, Genomic characterization of human and rat prolactinoma. *Endocrinology.* (2012) 153(8): 3679-91.

2013

12. **J. J. Zhou**, M. H. Cho, P. J. Castaldi, C. P. Hersh, E. K. Sliverman and N. M. Laird, Heritability of chronic obstructive pulmonary disease and related phenotypes in smokers. *American Journal of Respiratory and Critical Care Medicine.* (2013)188(8): 941-947

2014

13. D. Li[§] **J. J. Zhou**[§], D. C. Thomas and D.W. Fardo, Complex pedigrees in the sequencing era: to track transmissions or de-correlate? *Genetic Epidemiology.* (2014) 38(S1): S29-S36.

14. Y. C. Klimentidis, **J. J. Zhou**, N. E. Wineinger, Identification of allelic heterogeneity at type-2 diabetes loci and impact on prediction. *PloS One.* (2014) 9(11): e113072.13.

2015

15. Zheng, Y., **J. J. Zhou**, and Y. Tong. Gene signatures of drug resistance predict patient survival in colorectal cancer. *The Pharmacogenomics Journal.* (2015) 15.2: 135-143.

16. **J. J. Zhou**, M. H. Cho, C. Lange, S. Lutz, E. K. Silverman, and N. M. Laird, Integrating multiple correlated phenotypes for genetic association analysis by maximizing heritability. *Human Heredity.* (2015) 79:93-104

17. N. Zhao N, J. Chen, I. M. Carroll, T. Ringel-Kulka, M.P. Epstein, H. Zhou, **J. J. Zhou**, Y. Ringel, H. Li, M. C. Wu. Testing in microbiome-profiling studies with MiRKAT, the microbiome regression-based kernel association test. *American Journal of Human Genetics.* (2015) 96(5): 797-807.

18. Y. Zheng, J. Guo, J. Lu, **J. J. Zhou**, Q. Chen, C. Zhang, H. P. Koeffler and Y. Tong, FoxM1 transactivates PTTG1 and promotes colorectal cancer cell migration and invasion. *BMC Medical Genomics.* 8 (2015): 49.

2016

19. Y. Klimentidis, A. Arora, A. Chougule, **J. J. Zhou**, and D. Raichlen, FTO association and interaction with time spent sitting. *International Journal of Obesity.* (2016) 40(3): 411-6

20. W. Gu, C. I. Gurguis, **J. J. Zhou**, Y. Zhu, E. A. Ko, J. H. Ko, T. Wang, and T. Zhou, Functional and structural consequence of rare exonic single nucleotide polymorphisms: One Story, Two Tale. *Genome Biology and Evolution.* (2015) 7 (10): 2929-2940.

21. H. L. Twigg III, K. S. Knox, **J. J. Zhou**, K. A. Crothers, D. E. Nelson, E. Toh, R. B. Day, H. Lin, X. Gao, Q. Dong, D. Mi, B. P. Katz, E. Sodergren, G. M. Weinstock, Effect of advanced HIV infection on the respiratory microbiome, *American Journal of Respiratory and Critical Care Medicine*. (2016): 194(2): 226-235.

22. Y. Zhang, S. Wei, **J. J. Zhou**, H. Zhou, Regression models for multivariate count data, *Journal of Computational and Graphical Statistics*. (2017) 26(1): 1-13.

23. E. Vina, D. Ran, E. L. Ashbeck, S. A. Ibrahim, M. J. Hannon, **J. J. Zhou**, C. K. Kwoh, Patient preferences for total knee replacement surgery: relationship to clinical outcomes and stability of patient preferences over two years, *Seminars in Arthritis and Rheumatism*. (2016) 46(1): 27-33.

24. Y. C. Klimentidis, A. Arora, **J. J. Zhou**, R. Kittles, D. B Allison, The genetic contribution of West-African ancestry to protection against central obesity in African-American men but not women: results from the ARIC and MESA studies, *Frontiers in Genetics*. 7 (2016): 89.

25. **J. J. Zhou**, H. Tao, M. H. Cho, D. Qiao, H. Zhou, Boosting gene mapping power and efficiency with efficient exact variance component tests of single nucleotide polymorphism sets, *Genetics*. (2016) 204 (3) 921-931.

26. H. Fu, **J. J. Zhou**, and D. E. Faries. Estimating optimal treatment regimes via subgroup identification in randomized control trials and observational studies. *Statistics in Medicine*. (2016) 35(19): 3285-3302.

2017

27. R. Busch, B. D. Hobbs, **J. J. Zhou**, P. J Castaldi, M. J. McGeachie, M. E. Hardin, I. Hawrylkiewicz, P. Sliwinski, J.-J. Yim, W. J. Kim, D. K. Kim, A. Agusti, B. J. Make, J. D. Crapo, P. M. Calverley, C. F. Donner, D. A. Lomas, E. F. Wouters, J. Vestbo, R. Tal-Singer, P. Bakke, A. Gulsvik, A. A. Litonjua, D. Sparrow, P. D Par, R. D. Levy, S. I. Rennard, T. H. Beaty, J. Hokanson, E. K. Silverman, and M. H. Cho; for the NETT Genetics, ECLIPSE, ICGN, and COPDGene Investigators, Genetic association and risk scores in a COPD meta-analysis of 16,707 Subjects, *American Journal of Respiratory Cell and Molecular Biology*. (2017): 57(1):35-46

28. F. Hammer, A. Ishii, L. Johnstone, A. Tchourbanov, B. Lau, R. Sprissler, B. Hallmark, M. Zhang¶, **J. J. Zhou**, J. Watkins, S. Hirose, Rare variants of small effect size in neuronal excitability genes influence clinical outcome in Japanese cases of SCN1A truncation-positive Dravet syndrome, *PLOS One*. (2017): 12(7)

29. K. Doubleday¶, H. Zhou, H. Fu, **J. J. Zhou**, An algorithm for generating individualized treatment decision trees and random forests, *Journal of Computational and Graphical Statistics*. In Press. DOI:10.1080/10618600.2018.1451337

30. L. Hu, W. Lv, **J. J. Zhou**, H. Zhou, MM algorithms for variance component estimation and selection in logistic linear mixed model, *Statistica Sinica*. In Press. DOI:10.5705/ss.202017.0220.

2018

31. K. S. Jeong§, **J. J. Zhou**§, S. Griffin, E. Jacobs, D. Dearmon-Moore, J. Zhai, S. R. Littau, J. Gulotta, P. Moore, W. Peate, J. L. Burgess, MicroRNA changes in firefighters, *Journal of Occupational and Environmental Medicine*. (2018):469-474.

32. J. Zhai¶, K. S. Knox, H. Twigg III., H. Zhou, **J. J. Zhou**, Variance component selection with applications to microbiome taxonomic data, *Frontiers in Microbiology.* 9 (2018): 509.

33. T. Zhou, X. Xie, M. Li, J. Shi, **J. J. Zhou**, K. S. Knox, T. Wang, Q. Chen, W. Gu, BodyMap transcriptomes reveal unique circular RNA features mirroring the sexual maturity and aging of testes, *RNA*. (2018), DOI: 10.1261/rna.067132.118

34. **J. J. Zhou**, D. C. Schwenke, G. Bahn, and P. Reaven, Glycemic variation and cardiovascular risk in the veteran's affairs diabetes trial, *Diabetes Care*. (2018), 41(10):2187-94.

35. H. Zhou, L. Hu, **J. J. Zhou**, K. Lange, MM Algorithm for variance components Model, *Journal of Computational and Graphical Statistics*. DOI: 10.1080/10618600.2018.1529601

36. J. Zhai¶, K. S. Knox, H. Twigg III., H. Zhou, **J. J. Zhou**, Efficient exact tests for longitudinal microbiome studies, *Genetic Epidemiology*. 2019;1-13. DOI: 10.1002/gepi.22185

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

38. **J. J. Zhou**, T. G. Jenkins, A. M. Jung, K. S. Jeong, J. Zhai, E. T. Jacobs, S. C. Griffin, D. Dearmon-Moore, S. R. Littau, W. F. Peate, N. A. Ellis, P. Lance, J. L. Burgess4, DNA methylation among firefighters, *PLOS One*. Accepted

Peer Review Conference Proceedings

1. **J. J. Zhou**, W. Yip, MH Cho, D Qiao, MN McDonald, NM Laird, A comparative analysis of family and population based association tests using whole genome sequence data. *BMC Proceedings*. (2014), 8(Suppl 1):S33.

2. H. Zhou, **J. J. Zhou**, E. Sobel, K. Lange. Fast genome-wide pedigree QTL analysis using MENDEL. *BMC Proceedings*. (2014), 8(Suppl 1):S93.

3. X. Wang, X. Zhao, **J. J. Zhou**, Testing rare variants for hypertension using family-based tests with different weighting schemes. *BMC Proceedings*. (2016), 10(Suppl 7).

4. H. Zhou, **J. J. Zhou**, T. Hu, E. M. Sobel, K. Lange, Genome-Wide QTL and eQTL analysis using MENDEL. *BMC Proceedings*. (2016),10(Suppl 7).

Submitted Journal Publications

1. J. Zhai¶, K. S. Knox, H. Twigg III., H. Zhou, Y. Chen, **J. J. Zhou**, Lung microbiome associated with lung function in HIV-infected population treated with highly active antiretroviral therapy, *Lancet Respiratory Medicine*.

2. H. Zhou J. S. Sinsheimer, D. M. Bates, B. B. Chu, C. A. German, S. S. Ji, K. L. Keys, G. D. Mosher, J. C. Papp, E. M. Sobel, J. Zhai¶, **J. J. Zhou**, K. Lange, A cooperative programming project for statistical genetics, *Human Genetics*.

¶Trainee; §Joint first author

Software

1. `VCselection.jl`
   https://github.com/JingZhai63/VCselection
2. `PhylogeneticDistance.jl`
   https://github.com/JingZhai63/PhylogeneticDistance.jl
3. `ExactVC`
   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 7/20/2016 - 7/19/2019
   - Firefighter Prospective Cohort Framework Study
   - Total amount (% effort): $1,500,000 (10%)
6. U01AI122275 (Galgiani)
   - NIAAID 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%

YIWEN LIU

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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

- **Liu, Y.**, Sun, X., Zhong, W., and Li, B. (2019). B-scaling: a novel nonparametric data fusion method. Submitted to ***Journal of the American Statistical Association***. [PDF]

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

- M. Zhang, **Liu, Y.**, H. Zhou, J. Zhou, and J. Watkins. (2019) A novel non-linear dimension reduction approach to infer population structure for low-coverage sequencing data. In preparation.

- **Liu, Y.** and Zhong, W. (2019). A functional data deconvolution method for the simultaneous analysis of metabolomics mixtures by NMR spectroscopy and mass spectrometry. In preparation.

Publications

- **Liu, Y.**, Ma, P., Cassidy, P.A., Carmer, R., Zhang, G., Venkatraman, P., Brown, S.A., Pang, C.P., Zhong, W., Zhang, M., and Leung, Y.F. (2017). Statistical analysis of zebrafish locomotor behaviour by generalized linear mixed models. ***Scientific Reports***, 7:2937. [PDF]

- **Liu, Y.**, Xing, X., and Zhong, W. (2017). Sufficient dimension reduction for tensor data, in Handbook of big data analytics, edited by Härdle, W., Lu, H. H.-S. and Shen, X. ***Springer***. [Link]

- Zhang, L., Xiang, L., **Liu, Y.**, Venkatraman, P., Chong, L., Cho, J., Bonilla, S., Jin, Z.B., Pang, C.P., Ko, K.M., Ma, P., Zhang, M., and Leung, Y.F. (2016). A naturally-derived compound Schisandrin B enhanced light sensation in the pde6c zebrafish model of retinal degeneration. ***PLoS One***, 11(3). [PDF]

- **Liu, Y.**, Carmer, R., Zhang, G., Venkatraman, P., Brown, S.A., Pang, C.P., Zhang, M., Ma, P., and Leung, Y.F. (2015). Statistical analysis of zebrafish locomotor response. ***PLoS One***, 10(10). [PDF]

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*
- ICSA Applied Statistics Symposium, New Brunswick, NJ. Session organizer. *Jun 2018*
- ICSA Applied Statistics Symposium, Chicago, IL. Invited speaker. *Jun 2017*
- Georgia Informatics Symposium, Athens, GA. Poster session. *Oct 2016*
- Georgia Statistics Day, Athens, GA. Poster session. *Nov 2015*
- Society of Neuroscience, Chicago, IL. Poster session. *Oct 2015*
- ICSA Applied Statistics Symposium, Portland, OR. Invited speaker. *Jun 2014*

International

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

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 *Fall 2018*

· MATH 122A Functions for Calculus *Fall 2018*

Teaching Assistant
Department of Statistics, University of Georgia *2013-2017*

· MSIT 3000 Statistical Analysis for Business I *Fall 2013*

· STAT 6210 Introduction to Statistical Methods I *Spring 2014*

· STAT 6315 Statistical Methods for Researchers *Fall 2015*

· STAT 6800 Tools for Statistical Theory *Fall 2014*

· STAT 8700 Stochastic Process *Spring 2015, Spring 2016*

· STAT 8620 Categorical Data Analysis and Generalized Linear Models *Fall 2016, Fall 2017*

· STAT 8630 Mixed-Effect Models and Longitudinal Data Analysis *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

International Chinese Statistical Association, Institute of Mathematical Statistics.

Outreach Services

· Served as a judge for *Georgia Science and Engineering Fair*. Apr 2014
· Served as a speaker for *Speaker Series* at The Gwinnett School of Mathematics, Sci-
-ence, and Technology. Nov 2017

Curriculum Vitae
Dr. Chiu-Hsieh (Paul) Hsu

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University of Arizona
1295 N Martin Ave.
Drachman Hall A232
Tucson, AZ 85724

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(520) 626-5054

EDUCATION

1997 M.S. in Statistics, National Tsing Hua University, Hsinchu, Taiwan
Advisor: Professor Anne Chao. Thesis: "Under Random Effect Models, Inference for Capture-Recapture When Time, Behavioral Response, and Heterogeneity Affect Capture Probabilities"

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

2003 Ph.D. in Biostatistics, School of Public Health, University of Michigan, Ann Arbor. Advisor: Professor Jeremy M. G. Taylor. Thesis: "Survival Analysis via Nonparametric Multiple Imputation"

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
2018- Biostatistician, College of Nursing, University of Arizona

2016- 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.

1. #Chao A, Chu W, **Hsu CH**. Capture-Recapture When Both Time and Behavioral Response Affect Capture Probabilities, *Biometrics* 2000; **56**: 427-433.

2. #Taylor JMG, Weiss RE, Li W, **Hsu CH**, Suwinski R. Estimation for Paired Binomial Data with Application to Radiation Therapy. *Statistics in Medicine* 2001; **20**: 3375-3390.
3. #Taylor JMG, Murray S, **Hsu CH**. Survival Estimation and Testing via Multiple Imputation. *Statistics and Probability Letters* 2002; **58**: 221-232.
4. **Hsu CH**. Joint Modeling of Recurrence and Progression of Adenoma Polyps: A Latent Variable Approach. *Statistical Modelling* 2005; **5**: 201-215.
5. #**Hsu CH**, Taylor JMG, Murray S, Commenges D. Survival Analysis Using Auxiliary Variables via Nonparametric Multiple Imputation. *Statistics in Medicine* 2006; **25**: 3503-3517.
6. Chow H-HS, Hakim IA, Vining DR, Crowell JA, Cordova CA, Chew MW, Xu M-J, **Hsu CH**, Ranger-Moore J, Alberts DS. Effects of Repeated Green Tea Catechin Administration on Human Cytochrome P450 Activity. *Cancer Epidemiology, Biomarker & Prevention* 2006; **15**: 2473-2476.
7. Einspahr JG, Martinez ME, Jiang R, **Hsu CH,** Rashid A, Bhattacharrya AK, Ahnen DJ, Jacobs ET, Houlihan PS, Webb CR, Alberts DS, Hamilton SR. Association of Ki-*ras* Proto-oncogene Mutation and p53 Gene Overexpression in Sporadic Colorectal Adenomas with Demographic and Clinicpathologic Characteristics. *Cancer Epidemiology, Biomarker & Prevention* 2006; **15**: 1443-1450. PMID: 16896030.
8. Baker AF, Powis G, Tate WR, Ramanathan R, Roe D, **Hsu CH**, Kirkpatrick DL, Dragovich T. The Antitumor Thioredoxin-1 Inhibitor PX-12 (1-methylpropyl 2-imidazolyl disulfide) Decreases Thioredoxin-1 and VEGF Levels in Patient Plasma. *Journal of Laboratory and Clinical Medicine* 2006; **147** (2): 83-90.
9. Jacobs ET, Lanza E, Alberts DS, **Hsu CH**, Jiang R, Schatzkin A, Thompson PA, Martinez ME. Fiber, Gender, and Colorectal Adenoma: Results of a Pooled Analysis. *American Journal of Clinical Nutrition*, 2006; **83** (2): 343-349. PMID: 16469993.
10. Hess LM, Benham-Hutchins M, Herzog TJ, **Hsu CH**, Malone DC, Skrepnek GH, Slack MK, Alberts DS. A Meta-Analysis of the Efficacy of Intraperitoneal versus Intravenous Chemotherapy Regimens for the Front-Line Treatment of Ovarian Cancer. *International Journal of Gynecological Cancer* 2007; **17**: 561-570.
11. **Hsu CH**. A Weighted Zero-Inflated Poisson Model for Estimation of Recurrence of Adenomas. *Statistical Methods in Medical Research* 2007; **16**: 155-166.
12. #**Hsu CH**, Taylor JMG, Murray S, Commenges D. Multiple Imputation for Interval Censored Data with Auxiliary Variables. *Statistics in Medicine* 2007; **26**: 769-781.
13. **Hsu CH**, Green SB, He Y. A Weighted Logistic Regression Model for Estimation of Recurrence of Adenomas. *Statistics in Medicine* 2007; **26**: 1567-1578.
14. Tung WC, Farmer S, Ding K, Tung WK, **Hsu CH**. Stages of Condom Use and Decisional Balance among College Students. *International Nursing Review* 2009; **56**:346-353.
15. Tung WC, **Hsu CH**. Assessing Transcultural Validity of the Transtheoretical Model with Chinese Americans and Physical Activity. *Journal of Transcultural Nursing* 2009; **20**: 286-295.
16. Nyitray AG, Kim J, **Hsu CH**, Papenfuss M, Villa L, Lazcano-Ponce E, Giuliano AR. The Test-Retest Reliability of a Sexual Behavior Interview for Men Residing in Brazil, Mexico, and the United States: The HIM study. *American Journal of Epidemiology* 2009; **170**: 965-974.
17. **Hsu CH,** Taylor JMG. Nonparametric Comparison of Two Survival Distributions with Dependent Censoring via Nonparametric Multiple Imputation. *Statistics in Medicine* 2009; **28**: 462-475.
18. **Hsu CH**, Taylor JMG, Long Q, Alberts DS. Analysis of Colorectal Adenoma Recurrence Data Subject to Informative Censoring. *Cancer Epidemiology, Biomarkers & Prevention* 2009; **18** (3): 712-717.

19. **Hsu CH**, Long Q, Alberts DS. Estimation of Colorectal Adenoma Recurrence with Dependent Censoring. *BMC Medical Research Methodology* 2009; **9**: 66 doi:10.1186/1471-2288-9-66.
20. Komenaka IK, Torabi R, Nair RG, Jayaram L, **Hsu CH**, Bouton ME, Dave H, Hobohm DW. Intraoperative Touch Imprint and Frozen Section Analysis of Sentinel Lymph Nodes after Neoadjuvant Chemotherapy for Breast Cancer. *Annals of Surgery* 2010; **251**: 319-322.
21. Bartley AN, Thompson PA, Buckmeier JA, Kepler CY, **Hsu CH**, Snyder MS, Lance MP, Bhattacharyya A, Hamilton SR. Expression of Gastric Pyloric Mucin MUC6 in Colorectal Serrated Polyps. *Modern Pathology* 2010; **23**: 169-176.
22. Thompson PA, **Hsu CH**, Green S, Stopeck AT, Johnson K, Alberts DS, Chow H-HS. Sulindac and Sulindac Metabolites in Nipple Aspirate Fluid and Effect on Drug Targets in a Phase I Trial. *Cancer Prevention Research* 2010; **3**: 101-107.
23. Komenaka IK, Pennington PE, Jr., Schneider BP, **Hsu CH**, Norton LE, Clare SE, Zork NM, Goulet RJ, Jr. Differences in compliance of university hospital and county hospital breast cancer patients. *Clinical Breast Cancer* 2010 Oct 1; 10(5): 385-91.
24. Stratton M, Algotar A, Ranger-Moore J, Stratton S, Slate E, **Hsu CH**, Thompson P, Clark LC, Ahmann FR. Oral Selenium Supplementation Has No Effect on PSA Velocity in Men Undergoing Active Surveillance for Localized Prostate Cancer. *Cancer Prevention Research* 2010; **3**: 1035-1043.
25. Algotar AM, Thompson PA, Ranger-Moore J, Stratton MS, **Hsu CH**, Ahmann FR, Stratton SP. Effect of Aspirin, Other NSAIDs, and Statins on PSA and PSA Velocity. *The Prostate* 2010; **70**: 883-888.
26. Bouton M, Green A, Nodora J, Martinez M, **Hsu CH,** Komenaka I. Understanding of Breast Cancer Concepts in an Undereducated County Hospital Population. *Journal of Surgical Oncology* 2010; **102**: 398-403.
27. Algotar AM, Stratton MS, Stratton SP, **Hsu CH**, Ahmann FR. No Effect of Selenium Supplementation on Serum Glucose Levels in Men with Prostate Cancer. *American Journal of Medicine* 2010; **123**: 765-768.
28. Chow H-H, Garland L, **Hsu CH**, Vining D, Chew W, Miller J, Alberts D, Perloff M, Crowell J. Resveratrol Modulates Drug and Carcinogen Metabolizing Enzymes in a Healthy Volunteer Study. *Cancer Prevention Research* 2010; **3**: 1168-1175.
29. Komenaka IK, Martinez ME, Pennington RE, Jr., **Hsu CH**, Clare SE, Thompson PA, Murphy C, Zork NM, Goulet RJ, Jr. Race and Ethnicity and Breast Cancer Outcomes in an Underinsured Population. *JNCI* 2010; **102**: 1178-1187.
30. **Hsu CH,** Taylor JMG. A Robust Weighted Kaplan-Meier Approach for Data with Dependent Censoring Using Linear Combinations of Prognostic Covariates. *Statistics in Medicine* 2010; **29**: 2215-2223.
31. Long Q, Zhang X, **Hsu CH**. Nonparametric multiple imputation for ROC analysis when some biomarker values are missing. *Statistics in Medicine* 2011; 30: 3149-61.
32. **Hsu CH**, Li Y, Long Q, Zhao Q. A Weighted Logistic Regression Model for Estimation of Recurrence of Adenomas with Dependent Censoring. *PLoS ONE* 2011; **6**: e25141
33. Komenaka IK, **Hsu CH**, Martinez ME, Low BG, Salganick JA, Bouton ME, Nodora J, Hibbard ML, Jha C. Preoperative chemotherapy for operable breast cancer is associated with improved compliance with adjuvant therapy in matched Stage II and IIIA patients. *The Oncologist* 2011; **16**: 742-51.
34. Davis KM, **Hsu CH**, Bouton ME, Wilhelmson KL, Komenaka IK. Intraoperative ultrasound can decrease re-excision lumpectomy rate in patients with palpable breast cancers. *The American Surgeon* 2011; **6**: 720-725.

35. Komenaka IK, Hibbard ML, **Hsu CH**, Low BG, Salganick JA, Bouton ME, Jha C. Preoperative chemotherapy for operable breast cancer improves surgical outcomes in the community hospital setting. *The Oncologist* 2011 Jun; **16**(6): 752-9.
36. Algotar AM, Stratton MS, Xu MJ, Dalkin BL, Nagle RB, **Hsu CH**, Clark LC, Stratton SP. Dose-dependent effects of selenized yeast on total selenium levels in prostatic tissue of men with prostate cancer. *Nutrition and Cancer* 2011; **63**: 1-5.
37. Algotar AM, Stratton SP, Ranger-Moore J, Stratton MS, **Hsu CH**, Ahmann FR, Nagle RB, Thompson PA. Association of obesity and smoking with PSA and PSA velocity. *American Journal of Men's Health* 2011; **5**: 272-278.
38. Nguyen MM, Ahmann FR, Nagle RB, **Hsu CH**, Tangrea JA, Parnes HL, Sokoloff1 MH, Gretzer MB, Chow H-HS. Randomized, Double-Blind, Placebo-Controlled Trial of Polyphenon E in Prostate Cancer Patients before Prostatectomy: Evaluation of Potential Chemopreventive Activities. *Cancer Prevention Research* 2012; **5**: 290-298.
39. Bouton ME, Shirah GR, Nodora J, Pond E, **Hsu CH**, Klemens AE, Martinez ME, Komenaka IK. Implementation of educational video improves patient understanding of basic breast cancer concepts in an undereducated county hospital population. *Journal of Surgical Oncology* 2012 Jan; **105**(1): 48-54.
40. Curiel-Lewandrowski C, Swetter SM, Einsphar JG, **Hsu CH**, Nagle R, Sagerman P, Tangrea P, Parnes H, Alberts DS, Chow H-H. Randomized, Double-blind, Placebo Controlled Trial of Sulindac in Individuals at Risk for Melanoma: Evaluation of Potential Chemopreventive Activity. *Cancer* 2012; **118** (23): 5848-56.
41. Le A, Friese RS, **Hsu CH**, Wynne JL, Rhee P, O'Keeffe T. Sleep Disruptions and Nocturnal Nursing Interactions in the Intensive Care Unit. *Journal of Surgical Research* 2012; **177** (2): 310-4.
42. Algotar AM, Thompson PA, Ranger-Moore J, Stratton MS, **Hsu CH**, Ahmann FR, Nagle RB, Stratton SP. Differences in characteristics of men with localised prostate cancer who demonstrate low, intermediate or high prostate-specific antigen velocity. Internal Medicine Journal 2012; **42**: 374-380.
43. Thompson P, Roe DJ, Fales L, Buckmeier J, Wang F, Hamilton SR, Bhattacharyya A, Green S, **Hsu CH**, Chow H-HS, Ahnen DJ, Boland CR, Heigh RI, Fay DE, Martinez ME, Jacobs E, Ashbeck EL, Alberts DS, Lance P. Design and baseline characteristics of participants in a phase III randomized trial of celecoxib and selenium for colorectal adenoma prevention. *Cancer Prevention Research* 2012; **5** (12): 1381-93. PMID: 23060037.
44. Miller JA, Thompson PA, Hakim IA, Lopez AM, Thomson CA, Chew W, **Hsu CH**, Chow H-HS. Safety and Feasibility of Topical Application of Limonene as a Massage Oil to the Breast. *Journal of Cancer Therapy* 2012; **3**: 749-754.
45. Long Q, **Hsu CH**, Li Y. Doubly Robust Nonparametric Multiple Imputation for Ignorable Missing Data. *Statistica Sinica* 2012; **22**: 149-172.
46. **Hsu CH**, Nance DM, Amagase H. A Meta-Analysis of Clinical Improvements of General Well-being by a Standarized Lycium barbarum. *Journal of Medicinal Foods* 2012; **15** (11): 1006-14.
47. Algotar AM, **Hsu CH**, Singh P, Stratton SP. Selenium supplementation has no effect on serum glucose levels in men at high risk for prostate cancer. *Journal of Diabetes* 2013; doi: 10.1111/1753-0407.
48. Algotar AM, Stratton MS, Ahmann FR, Ranger-Moore J, Nagle RB, Thompson PA, Slate E, **Hsu CH**, Dalkin BL, Sindhwani P, Holmes MA, Tuckey JA, Graham DL, Clark LC, Stratton SP. Phase 3 clinical trial investigating the effect of selenium supplementation in men at high risk for prostate cancer. *Prostate* 2013; **73** (3): 328-35: PMID: 22887343.

49. Miller JA, Lang JE, Ley M, Nagle R, **Hsu CH**, Thompson PA, Cordova C, Waer A, Chow H-HS. Human breast tissue disposition and bioactivity of limonene in women with early stage breast cancer. *Cancer Prevention Research* 2013; **6**: 577-584.
50. Torabi R, **Hsu CH**, Patel PN, Dave H, Bouton ME, Komenaka IK. Predictors of margin status after breast conserving operations in an underscreened population. Langenbecks Arch Surg 2013 (Accepted for publication October 2012). PMID: 23184267.
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Complete List of Dr. Hsu's Publications can be accessed at
http://www.ncbi.nlm.nih.gov/sites/myncbi/chiu-hsieh.hsu.1/bibliography/47866684/public/?sort=date&direction=ascending

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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
- Designed and implemented quality-control protocols for software testing and verification before commissioning
- 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.

B.Tech., Electronics and Communication Engineering, Jaypee University of Information Technology, Solan, Himachal Pradesh, India (2006)

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