

Ann E. Wells

PHD · STATISTICS MASTERS

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Education

University of Tennessee-Knoxville

PH.D. IN GENOME SCIENCE AND TECHNOLOGY

Knoxville, TN

2010 - 2017

University of Tennessee-Knoxville

M.S. IN STATISTICS

Knoxville, TN

2010-2017

University of Tennessee-Knoxville

B.S. IN MICROBIOLOGY

- minor: Business

Knoxville, TN

2006-2009

Research Experience

Graduate Research Assistant (Mentor: Dr. Brynn Voy)

PROJECT TITLE: UNTARGETED METABOLIC PROFILING DISTINGUISHES GENE-BY-DIET "METABOTYPES" AT THE TISSUE LEVEL IN MICE

Knoxville, TN

Mar. 2011 - PRESENT

- Collected adipose, skeletal muscle, and liver tissue from mice
- Extracted metabolites from tissue using Mass spectrometry
- Picked metabolite peaks from raw results
- Utilized linear models and multivariate statistics to analyze metabolite abundances from mouse tissue

PROJECT TITLE: THE EFFECT OF LOW DOSE RADIATION ON MACROPHAGE POPULATIONS IN BXD MICE

- Irradiated mice
- Extracted bone marrow from mice femurs
- Performed cardiac punctures to extract blood from mice
- Dissected liver, spleen, thymus, lung, and femur from mice
- Performed macrophage migration assay

PROJECT TITLE: MECHANISMS OF POPULATION LEVEL VARIATION IN FATNESS AND LEANNESS

- Extracted RNA from BXD recombinant inbred strain mice adipose tissue
- Performed qPCR on adipogenesis genes
- Analyzed qPCR results using correlation and partial correlation
- Calculated deltaCT and standard curves

Graduate Research Assistant (Mentor: John Biggerstaff)

PROJECT TITLE: MELANOMA TUMOR GROWTH AND METASTASIS IN ZEBRAFISH

Knoxville, TN

Aug. 2010 - Mar. 2011

- Maintained hepatic and melanoma cancer immortal cell lines
- Microinjected GFP labeled melanoma/hepatic cells into zebrafish larvae
- Tracked cell growth using deconvolution and time lapse microscopy

Research Alliance in Math and Science Intern (Mentor: Kara Kruse)

PROJECT TITLE: MODELING THE EFFECT OF SOLUBLE FIBRIN ON THE IMMUNE-TUMOR INTERACTION

Oak Ridge, TN

June 2010 - Aug. 2010

- Developed a series of differential equations to simulate the effect of soluble fibrin on the interaction between macrophages and melanoma cells using physiologically relevant estimates
- Separated blood to isolate macrophages
- Performed a macrophage migration assay
- Measured macrophage movement using deconvolution and time lapse microscopy

Research Alliance in Math and Science and Student Undergraduate Laboratory Internship (Mentor: Kara Kruse)

PROJECT TITLE: MODELING THE EFFECT OF MELANOMA TUMOR CELL GROWTH IN THE PRESENCE OF NATURAL KILLER CELLS

Oak Ridge, TN

June 2009 - Apr. 2010

- Developed a series of differential equations to simulate the effect of soluble fibrin on the interaction between natural killer cells and melanoma cells using physiologically relevant estimates
- Performed sensitivity analysis in Matlab to test robustness of model

Undergraduate Research Assistant (Mentor: Dr. Ted Henry)

Knoxville, TN

PROJECT TITLE: DETECTION OF OXIDATIVE STRESS IN ZEBRAFISH WHEN EXPOSED TO C60 NANOPARTICLES

May 2008 - June 2009

- Maintained zebrafish
- Aided zebrafish exposure to C60 nanoparticles

PROJECT TITLE: EFFECTS OF *Microcystis aeruginosa* ON ZEBRAFISH REPRODUCTION

- Maintained *Microcystis aeruginosa* cultures
- Lyophilized *Microcystis aeruginosa*
- Dissected liver from zebrafish
- Cryosectioned and H and E stained liver tissue

PROJECT TITLE: BIOACCUMULATION OF *Microcystis aeruginosa* IN CHANNEL CATFISH

- Maintained large scale production of *Microcystis aeruginosa* cultures
- Dissected muscle from channel catfish
- Performed channel catfish husbandry

PROJECT TITLE: DETECTION OF ESTROGENIC ACTIVITY IN *Microcystis aeruginosa* USING A YEAST ESTROGEN BIOREPORTER

- Maintained *Microcystis aeruginosa* cultures
- Analyzed estrogenic levels from *Microcystis aeruginosa*

Wet Lab Skills

- Zebrafish spawning
- Maintenance of larval and adult zebrafish
- Paramecia culturing
- Brine shrimp culturing
- Yeast estrogen bioreporter assay
- Large-scale cyanobacterial culturing
- Water quality testing and monitoring
- Microinjection of zebrafish embryos and larvae
- Zebrafish dissection
- Channel catfish dissection
- Mouse dissection
- Chicken dissection
- Mouse Husbandry
- Cardiac punctures (mouse)
- Bone marrow extraction (mouse)
- H and E stain
- Cryosectioning
- Immunostaining
- Deconvolution microscopy
- RNA extraction
- qPCR
- Blood separation
- Tissue culture
- Cell migration assays
- Flow Cytometry
- Metabolomics
- Metabolite extraction
- Peak Analysis

Dry Lab Skills

Statistics Multivariate Statistics: PLS, PLS-DA, PCA, ANOVA, Linear models

Computer Skills

Programming	Working knowledge in C++, Matlab, and Python
Scientific Applications	SAS: PROC GLM, FREQ, UNIVARIATE, MEANS; R: DiscriMiner, ggplot2, reshape, Hmisc, psych, grid, caret; Linux
Other Applications	MS Office, iWork, LaTeX
Operating Systems	MS Windows, OS Sierra

Teaching Experience

Graduate Teaching Assistant

Knoxville, TN

CELLULAR AND MOLECULAR BIOLOGY (BIO 160)

Spring 2016, Fall 2016, Spring 2017

- Taught students how to critically analyze scientific articles during discussion
- Prepared weekly presentations and multiple quizzes
- Aided instructor during lecture
- Graded homework, quizzes, and exams

Graduate Teaching Assistant

Knoxville, TN

BIOINFORMATICS APPLICATIONS (EPP 622)

Fall 2015

- Held weekly office hours to review material
- Guided students through computer labs
- Designed and taught Metabolomics lecture and computer lab
- Taught DNaseq computer lab
- Graded homework

Graduate Teaching Assistant

SKILLS OF BIOLOGICAL INVESTIGATION (BIO 159)

- Independently instructed students through experimentally based labs
- Taught students experimental design
- Prepared weekly presentations and multiple quizzes
- Graded quizzes and lab reports

Knoxville, TN

Spring 2015

Graduate Teaching Assistant

DESIGNED UNDERGRADUATE BIostatISTICS COURSE FOR BIOLOGY DEPARTMENT (STILL IN DEVELOPMENT)

- Aided Genome Science and Technology director in designing Biostatistics course for undergraduates
- Planned bioinformatics topics to cover throughout the semester
- Designed syllabus
- Outlined labs associated with topics

Knoxville, TN

Fall 2014

Graduate Teaching Assistant

ANIMAL BREEDING AND GENETICS (ANSC 340)

- Aided instructor during class
- Guest lecturer
- Proctored exams
- Graded homework and exams

Knoxville, TN

Spring 2014

Publications

ACCEPTED

WILLIAM T. BARRINGTON, PHILLIP WULFRIDGE, ANN E. WELLS, CAROLINA MANTILLA ROJAS, SELENE Y.F. HOWE, AMIE PERRY, KUNJIE HUA, MICHAEL PELLIZZON, KASPER D. HANSEN, BRYNN VOY, BRIAN J. BENNETT, DANIEL POMP, ANDREW P. FEINBERG, DAVID W. THREADGILL. (2017) OPTIMIZING METABOLIC HEALTH THROUGH PRECISION DIETETICS IN MICE. GENETICS.

WELLS, A.E., BEWICK, S.A., KRUSE, K.L., WARD, R.C., BIGGERSTAFF, J.P. (2011). MODELING THE EFFECT OF SOLUBLE FIBRIN ON THE IMMUNE-TUMOR INTERACTION. PROCEEDINGS OF IEEE/EMBS.

WELLS, A.E., BEWICK, S.A., KRUSE, K.L., WARD, R.C., BIGGERSTAFF, J.P. (2010). MODELING THE EFFECT OF TUMOR CELLS WHEN IN THE PRESENCE OF NATURAL KILLER CELLS. PROCEEDINGS OF IEEE/EMBS.

IN-PROGRESS

ANN E. WELLS, WILLIAM T. BARRINGTON, STEPHEN DEARTH, DAVID W. THREADGILL, SHAWN CAMPAGNA, BRYNN VOY. TISSUE LEVEL DIET AND SEX-BY-DIET INTERACTIONS REVEAL UNIQUE METABOLITE AND CLUSTERING PROFILES USING UNTARGETED LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY ON ADIPOSE, SKELETAL MUSCLE, AND LIVER TISSUE IN C57BL6/J MICE.

SUBMITTED TO THE JOURNAL OF PROTEOME RESEARCH

ANN E. WELLS, WILLIAM T. BARRINGTON, STEPHEN DEARTH, DAVID W. THREADGILL, SHAWN CAMPAGNA, BRYNN VOY. TISSUE LEVEL STRAIN AND SEX-BY-STRAIN INTERACTIONS REVEAL UNIQUE METABOLITE AND CLUSTERING PROFILES USING UNTARGETED LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY ON ADIPOSE, SKELETAL MUSCLE, AND LIVER TISSUE IN MICE FED A STANDARD CHOW DIET.

ABSTRACTS

WELLS, ANN, BARRINGTON, BILL, DEARTH, STEPHEN, THREADGILL, DAVID, CAMPAGNA, SHAWN, VOY, BRYNN. 2017. TISSUE LEVEL SEX-BY-GENE-BY-DIET INTERACTIONS SHOW UNIQUE METABOLITE AND CLUSTERING PROFILES. PRESENTED AT THE GENOME SCIENCE AND TECHNOLOGY RETREAT

WELLS, ANN, BARRINGTON, WILLIAM, THREADGILL, DAVID, DEARTH, STEPHEN, CAMPAGNA, SHAWN, SAXTON, ARNOLD, VOY, BRYNN. APRIL 2016. GENE, SEX, AND DIET INTERACT TO CONTROL THE TISSUE METABOLOME. THE FASEB JOURNAL. VOL. 30, NO. 1, SUPPLEMENT 127.2.

WELLS, ANN, BARRINGTON, BILL, DEARTH, STEPHEN, THREADGILL, DAVID, CAMPAGNA, SHAWN, VOY, BRYNN. 2016. TISSUE LEVEL SEX-BY-GENE-BY-DIET INTERACTIONS SHOW UNIQUE METABOLITE AND CLUSTERING PROFILES. PRESENTED AT THE GENOME SCIENCE AND TECHNOLOGY RETREAT

WELLS, ANN, BARRINGTON, BILL, THREADGILL, DAVID, CAMPAGNA, SHAWN, VOY, BRYNN. JUNE 2015. UNTARGETED METABOLIC PROFILING DISTINGUISHES GENE-BY-DIET “METABOTYPES” AT THE TISSUE LEVEL IN MICE. PRESENTED AT AMERICAN SOCIETY FOR MASS SPECTROMETRY CONFERENCE

WELLS, ANN, BARRINGTON, BILL, THREADGILL, DAVID, CAMPAGNA, SHAWN, VOY, BRYNN. APRIL 2015. INVESTIGATING TISSUE LEVEL GENE-BY-DIET INTERACTIONS WITH METABOLOMICS. THE FASEB JOURNAL. VOL. 29, NO. 1, SUPPLEMENT 755.19.

WELLS, ANN, DAS, SUCHITA, JI, BO, VOY, BRYNN. APRIL 2013. MECHANISMS OF POPULATION LEVEL VARIATION IN FATNESS AND LEANNESS. THE FASEB JOURNAL. VOL. 27, NO.1, SUPPLEMENT 1212.2.

Presentation

ORAL

Gene, Sex, and Diet Interact to Control the Tissue Metabolome

EXPERIMENTAL BIOLOGY

San Diego, CA

Apr. 2016

Mechanisms of Population Level Variation in Fatness and Leanness

COMPARATIVE AND EXPERIMENTAL MEDICINE AND PUBLIC HEALTH RESEARCH SYMPOSIUM

Knoxville, TN

June 2010

Modeling Melanoma Tumor Cell Growth in the Presence of Natural Killer Cells

SIGMA XI STUDENT COMPETITION

Knoxville, TN

Feb. 2010

POSTER

Tissue Level Sex-by-gene-by-diet Interactions Show Unique Metabolite and Clustering Profiles

GENOME SCIENCE AND TECHNOLOGY RETREAT

Knoxville, TN

Mar. 2017

Experimental Biology

TISSUE LEVEL SEX-BY-GENE-BY-DIET INTERACTIONS SHOW UNIQUE METABOLITE AND CLUSTERING PROFILES

- 2nd Place Emerging Leaders in Nutrition Poster Competition

San Diego, CA

Apr. 2016

Tissue Level Sex-by-gene-by-diet Interactions Show Unique Metabolite and Clustering Profiles

GENOME SCIENCE AND TECHNOLOGY RETREAT

- 1st Place Cynthia B. Peterson Poster Competition

Knoxville, TN

Mar. 2016

Untargeted Metabolomics Profiling Distinguishes Gene-by-diet “Metabotypes” at the Tissue Level in Mice

AMERICAN SOCIETY FOR MASS SPECTROMETRY

St. Louis, MO

Jun. 2015

Investigating Tissue Level Gene-by-diet Interactions with Metabolomics

EXPERIMENTAL BIOLOGY

Boston, MA

Mar. 2015

Investigating Tissue Level Gene-by-diet Interactions with Metabolomics

GENOME SCIENCE AND TECHNOLOGY RETREAT

Knoxville, TN

Mar. 2015

Metabolomics Identifies Effects of Dietary Macronutrient Composition on Tissue Metabolism

THE OBESITY SOCIETY

Boston, MA

Nov. 2014

Metabolism and Diet: Metabolic and Lipid Changes Across Multiple Diets and Genetic Backgrounds

GENOME SCIENCE AND TECHNOLOGY RETREAT

Knoxville, TN

Mar. 2014

Mechanisms of Population Level Variation in Fatness and Leanness

EXPERIMENTAL BIOLOGY

Boston, MA

Apr. 2013

Modeling the Effect of Soluble Fibrin on the Immune-Tumor Interaction

BIOLOGICAL SCIENCE AND ENGINEERING CENTER CONFERENCE

- 2nd Place BSEC Poster Competition

Oak Ridge, TN

Mar. 2011

Modeling the Effect of Soluble Fibrin on the Immune-tumor Interaction

RESEARCH ALLIANCE IN MATH AND SCIENCE

Oak Ridge, TN

Aug. 2010

Modeling the Effect of Melanoma Tumor Cells when in the Presence of Natural Killer Cells

BIOLOGICAL SCIENCE AND ENGINEERING CENTER CONFERENCE

- 2nd Place BSEC Poster Competition

Oak Ridge, TN

May 2010

Modeling the Effect of Melanoma Tumor Cells when in the Presence of Natural Killer Cells

WOMEN IN SCIENCE

Oak Ridge, TN

May 2010

Modeling Immunity Against Cancer

STUDENT UNDERGRADUATE LABORATORY INTERNSHIP

Oak Ridge, TN

Apr. 2010

Modeling the Effect of Melanoma Tumor Cells when in the Presence of Natural Killer Cells

STUDENT UNDERGRADUATE LABORATORY INTERNSHIP

Oak Ridge, TN

Dec. 2009

A Mathematical Models of the Effect of Melanoma Tumor Cell Growth when in the Presence of Natural Killer Cells

RESEARCH ALLIANCE IN MATH AND SCIENCE

Oak Ridge, TN

Aug. 2009

Academic Honors & Awards

AWARDS

2017	Graduate Student Senate Excellence in Teaching Award	Knoxville, TN
2016	2nd Place , Experimental Biology American Nutrition Society Emerging Leaders Poster Competition	San Diego, CA
2016	1st Place , Cynthia B. Petersen Poster Competition	Knoxville, TN
2015	Graduate Student Travel Award	Knoxville, TN
2011	2nd Place , BSEC Poster Competition	Oak Ridge, TN
2010	2nd Place , BSEC Poster Competition	Oak Ridge, TN

HONORS

2008	Phi Sigma Theta National Honor Society	Knoxville, TN
2008	Omicron Delta Kappa National Leadership Honor Society	Knoxville, TN
2008	Golden Key National Honor Society	Knoxville, TN

Fellowships

NIH funded PEER Fellowship

Knoxville, TN

Aug. 2011 - Aug. 2013

Microbiology Department Summer Research Fellowship

Knoxville, TN

\$3200 STIPEND

May 2008 - Aug. 2008

Professional Memberships

American Society for Nutrition

STUDENT MEMBER

American Physiological Society

STUDENT MEMBER

References

Dr. Brynn Voy

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Program
Dept. of Animal Science
University of Tennessee-Knoxville
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Dr. Albrecht von Arnim

Director of Genome Science and
Technology Program
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Molecular Biology
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Dr. Vitaly Ganusov

Genome Science and Technology
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Microbiology
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