

BIOGRAPHICAL SKETCHNAME: **Wei Zheng**

eRA COMMONS USER NAME: zhengw

POSITION TITLE: Anne Potter Wilson Chair, Professor and Director, Vanderbilt Epidemiology Center

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
Shanghai Medical School, Fudan University	MD	07/1983	Preventive Medicine
Shanghai Cancer Institute & Shanghai Medical Sch.	MPH	06/1986	Cancer Epidemiology
The Johns Hopkins University	PhD	05/1992	Epidemiology

A. Personal Statement

My major research focus is on investigating environmental exposures, lifestyle factors, biomarkers and genetic factors for cancer risk. I have been the PI or an MPI for 38 NIH grants, including 27 large R01/U01 or equivalent grants, and have authored or co-authored more than 1100 publications. I am the PI or contact MPI for two large prospective cohort studies, the Southern Community Cohort Study and Shanghai Women's Health Study, in which more than 160,000 individuals were recruited for long-term epidemiology and genetic studies of cancer and other chronic diseases (see - **Contribution to Science C#2**). Over the past 15 years, I have initiated five large consortia/pooling projects (see **C#3 and #5**), collaborated on >30 other research consortia and served on the NCI Cohort Consortium Steering Committee. I have served as the primary mentor for more than 50 junior investigators, postdoc fellows and graduate students, including >20 assistant professors and helped them obtain large numbers of career development awards (K99/R00 and K07) and research grants (R01 and R03) to launch their independent research career (see **C#1**). I will be happy to contribute my experience and expertise to the research and training program proposed in this application.

- Zheng W**, McLerran DF, et al. Association between body-mass index and risk of death in more than 1 million Asians. N Engl J Med 2011;364(8):719-29. PMID: PMC4008249
- Zhang B, other authors, **Zheng W**. Large-scale genetic study in East Asians identifies six new loci associated with colorectal cancer risk. Nat Genet 2014;46(6):533-42. PMID: PMC4068797.
- Wu L, >100 other authors, **Zheng W**. A transcriptome-wide association study of 229,000 women identifies new candidate susceptibility genes for breast cancer. Nat Genet 50 (7):968-78, 2018. PMID:29915430
- Lu Y, Kweon SS, Tanikawa C, Jai WH, Xiang YB, Cai Q, other authors, **Zheng W**. Large-scale Genome-wide Association Study of East Asians Identifies New Loci Associated with Risk for Colorectal Cancer. Gastroenterology 2019 Apr;156(5):1455-1466. PMID:6441622.

B. Positions and Honors

1983 – 1989 Research Associate/Fellow/Assistant, Shanghai Cancer Institute
1985 – 1986 Visiting Researcher, Biostatistics Branch, National Cancer Institute
1989 - 1991 Research Assistant/Library Assistant, School of Hygiene & Public Health, Johns Hopkins Univ.
1991 – 1993 Visiting Associate, Biostatistics Branch/Division of Cancer Etiology, National Cancer Institute
1993 – 1997 Assistant Professor, Division of Epidemiology, University of Minnesota
1997 – 1997 Associate Professor (tenured), Division of Epidemiology, University of Minnesota
1998 – 2000 Professor, Depts. of Epidemiology & Biostatistics and Pathology, University of South Carolina
2000 – Pres. Professor, Department of Medicine, Vanderbilt University Medical Center (VUMC)
2000 – 2009 Director, Epidemiology Section, Division of Internal Medicine and Public Health, VUMC
2006 – Pres. Founding Director, Vanderbilt Epidemiology Center, VUMC
2009 – Pres. Founding Director, Division of Epidemiology, Dept. of Medicine, VUMC
2000 – 2014 Ingram Professor of Cancer Research, Vanderbilt-Ingram Cancer Center
2014 – Pres. Anne Potter Wilson Chair in Medicine, Vanderbilt University School of Medicine
2000 – Pres. Member, Vanderbilt-Ingram Cancer Center: Director of Molecular Epidemiology (2000-2006), Co-leader of the Breast Cancer Research Program (2002-2006), Co-Leader of the Cancer Epidemiology Program (2006 – present)

03/09 – Pres. Member, VUMC Executive Faculty
2015 - 2016 Member of the Executive Committee, VUMC Executive Faculty

Honors

1992 Graduated with Phi Beta Kappa, Johns Hopkins University (Ph.D. in Epidemiology)
2009 – Pres. Member (elected), American Epidemiological Society (AES)
2009 – 2015 MERIT Award, National Cancer Institute, NIH
2009 – 2018 Eight-time winner of the Vanderbilt-Ingram Cancer Center Annual High Impact Award
2010 – 2019 25 papers rated as the annual Top 10 Publications at the Vanderbilt Epidemiology Center
2015 Highly Cited Researchers, The World's Most Influential Scientific Minds. Thomson Reuters
2016 Highly Cited Researchers, Thomson Reuters Web of Science.
2018 Highly Cited Researchers, Clarivate Analytics Web of Science
July 2019 Vietnam Ministry of Health's Memorabilia Medal, the country's highest honorable medal to foreign scientists for their contribution to public health

Selected Other Professional Activities

Regular Member, EDC-2/EPIC (NIH) 4/98-6/01
Member or Chairperson, > 20 grant review panels for NIH since 1997, including EPIC subcommittees, CCSG site visit teams, SPOREs, Program Projects, and Early Detection Network panels
Member, >30 grant review panels for the DoD, Komen Foundation, UK MRC, Cancer Research UK, and others
Member, Steering Committee, Molecular Epidemiology Working Group, AACR, 2011 - 2013
Editorial Board member, *Cancer Epidemiology, Biomarkers & Prevention*, 2003 – 2014
Editorial Board member, *Carcinogenesis*, 2011 – 2014
Editorial Board member, *Cancer Research*, 2013 – 2016
Editorial Board member, *Current Epidemiology Reports*, 2016 - present
Associate Editor, *American Journal of Epidemiology*, 2008 – present
Senior Editor, *Cancer Epidemiology, Biomarkers & Prevention*, 2014 – present
Academic Editor, *PLOS Medicine*, 2017 - present
Member, Executive Committee for the Asia Cohort Consortium, 2008 - present
Member, Steering Committee for the NCI Cohort Consortium, 2014 – 2017
Member, AACR Cancer Epidemiology and Prevention Awards Committee, 2014 – 2016
Member, Advisory Board, Health Data Science, 2020 - present

C. Contributions to Science (>1100 peer-reviewed publications): Provided below are five specific examples.

1. **Developing Vanderbilt Epidemiology Program and Mentoring Junior Investigators:** I have devoted substantial effort to develop the epidemiology research and training program at Vanderbilt. Since 2000, I have served as the primary mentor for >50 junior faculty members, postdoc fellows and graduate students, including approximately 20 assistant professors. Virtually all of these junior investigators have obtained external funding and launched their research programs, and most of them have been promoted to associate professor; five have been promoted again to full professor. Selected publications from these investigators during their mentoring period are provided below. I was appointed as the founding director for the Vanderbilt Epidemiology Center in 2006 and the Division of Epidemiology in 2009. The Division of Epidemiology currently consists of ~25 faculty members who direct a large number of research projects and publish >200 research papers annually.
 - a. Fowke JH*, Chung FL, Jin F, Dai Q, others, Gao YT, **Zheng W.** Urinary isothiocyanate levels, *Brassica*, and human breast cancer. *Cancer Res* 2003;63: 3980-86. PMID: 12873994 (**Currently, Director, Division of Epidemiology, University of Tennessee*).
 - b. Shrubsole MJ*, Ness RM, Wu H, Shyr Y, Smalley W, **Zheng W.** Alcohol drinking, cigarette smoking, and risk of colorectal adenomatous and hyperplastic polyps. *Am J Epidemiology* 2008,167(9):1050-8, PMID: 18304959. (**Currently, Director, Survey Research Shared Resource, VUMC*).
 - c. Murff HJ*, Shrubsole MJ, Cai Q, Smalley WE, Dai Q, Milne GL, Ness RM, **Zheng W.** Dietary intake of PUFAs and colorectal polyp risk. *Am J Clin Nutr* 2012;95(3):703-12. PMID: PMC3278245 (**Currently, Director, Division of Geriatric Medicine, VUMC*)

- d. Epplein M*, Shu XO, Xiang YB, others, Gao YT, **Zheng W**. Fruit and vegetable consumption and risk of distal gastric cancer. *Am J Epidemiol* 2010;172(4):397-40. PMID: PMC2950795 (*Currently, Co-Leader, Cancer Control and Population Sciences, Duke Cancer Institute).

2. **Development of Epidemiology Research Resources:** High quality exposure/outcome data and biological samples obtained from well-conducted studies are the foundation of epidemiologic research. In 1996, I initiated the Shanghai Women's Health Study, a large prospective cohort study of approximately 75,000 women. Over the past 25 years, I have also initiated several other NCI-funded large-scale epidemiologic studies, including the Nashville Breast Health Study, Shanghai Breast Cancer Study, Tennessee Colorectal Polyp Study, Tennessee-Indiana Adenoma Recurrence Follow-up Study, and Southern Tri-State Breast Cancer Study with the recruitment and follow-up of >25,000 additional study participants. I am a key founding investigator for two other large cohort studies, the Shanghai Men's Health Study and Southern Community Cohort Study (SCCS), and currently serve as an MPI for the SCCS. Data and biological samples collected in these studies have been used to investigate a wide range of significant issues related to lifestyle, genetics, and biomarkers for the risk and prognosis of cancer and other chronic diseases, resulting in > 800 publications.

- a. **Zheng W**, et al. The Shanghai Women's Health Study: Rationale, study design, and baseline characteristics. *Am J Epidemiol* 2005;162:1123-31. PMID: 16236996 (SWHS)
- b. Fu Z, Shrubsole MJ, Li G, Smalley WE, others, Ness RM, **Zheng W**. Using gene-environment interaction analyses to clarify the role of well-done meat and heterocyclic amine exposure in the etiology of colorectal polyps. *Am J Clin Nutr* 2012, 96(5):1119-28, PMID: PMC3471199 (TCPS)
- c. Shu XO, Li H, Yang G, Gao J, Cai H, Takata Y, **Zheng W**, Xiang YB. Cohort Profile: The Shanghai Men's Health Study. *Int J Epidemiol*. 2015;44(3):810-18. PMID: PMC4521127 (SMHS)
- d. Warren Andersen S, **Zheng W**, others, Blot WJ. Combined Impact of Health Behaviors on Mortality in Low-Income Americans. *Am J Prev Med*. 51(3):344-55, 2016. PMID: PMC4992598 (SCCS)

3. **Identification of Genetic Susceptibility Factors for Cancer:** Most large genetic association studies are conducted in European descendants. The unique genetic architecture and exposure patterns in non-European populations provide great opportunities to identify novel genetic risk variants for cancer. In 2009 – 2010, I initiated two large consortia to search for genetic risk loci for breast and colorectal cancers in Asians. Over the years, these consortia have grown into large collaborations, including more than 160,000 cases and controls recruited from more than 50 studies. We have identified >100 novel susceptibility loci/variants for these common cancers and contributed to > 20 other international genetic research consortia of multiple cancers. In 2016, I initiated and since then have directed a large consortium which includes ~40,000 cases and controls of African ancestry to search for genetic risk variants for breast cancer.

- a. **Zheng W**, et al. Genome-wide association study identifies a new breast cancer susceptibility locus at 6q25.1. *Nat Genet* 2009;41(3):324-8. PMID: PMC2754845
- b. Jia WH, 20 other authors, **Zheng W**. Genome-wide association analyses in east Asians identify new susceptibility loci for colorectal cancer. *Nat Genet* 45(2):191-196, 2013 PMID: PMC3679924
- c. Zhang B, other authors, **Zheng W**. Large-scale genetic study in East Asians identifies six new loci associated with colorectal cancer risk. *Nat Genet* 2014;46(6):533-42. PMID: PMC4068797.
- d. Wu L, >100 other authors, **Zheng W**. A transcriptome-wide association study of 229,000 women identifies new candidate susceptibility genes for breast cancer. *Nat Genet* 50 (7):968-78, 2018. PMID:29915430.

4. **Identification of Lifestyle Factors and Biomarkers for Cancer Risk:** I have conducted studies both in the U.S. and abroad to investigate many dietary hypotheses, using both traditional epidemiologic methodology and new approaches, such as gene-environment interactions and Mendelian randomization. For example, I published one of the first papers revealing a positive association of breast cancer risk with well-done meat intake and meat-carcinogen exposures. Subsequently, I published a series of papers evaluating possible gene-diet interactions in the risk of breast cancer and colorectal adenomas. I conducted the first prospective study to evaluate the association of urinary prostaglandin E₂ metabolites (PGE-M) with colorectal cancer risk. Subsequent studies conducted by our group and others have shown

that PGE-M is an important risk marker for colorectal cancer, and this marker is now being used in interventional trials as an intermediate outcome. I have published many papers investigating potential dietary protective factors for cancer, including soy food and green tea.

- a. **Zheng W**, et al. Well-done meat intake and the risk of breast cancer. J Natl Cancer Inst 1998; 90:1724-9. PMID: 9827527
- b. Cai QY, Gao YT, Chow WH, others, Morrow J, **Zheng W**. Prospective study of urinary prostaglandin E₂ metabolites and colorectal cancer risk. J Clin Oncol 2006; 24:5010-6. PMID: 17075120
- c. Shrubsole MJ, Cai Q, Wen W, others, Ness RM, **Zheng W**. Urinary prostaglandin E₂ metabolite and risk for colorectal adenoma. Cancer Prev Res 5(2):336-42, 2012. PMCID: PMC3273609.
- d. Khankari NK, Shu X-O, Wen W, Kraft P, others, **Zheng W**. Association between adult height and risk of colorectal, lung, and prostate cancer: results from meta-analyses of prospective studies and Mendelian randomization analyses. PLoS Med. 13(9):e1002118, 2016. PMCID: PMC5012582

5. **Impact of Body Weight and Lifestyle Factors on Total and Cause-specific Mortality:** I play a leadership role in the Asia Cohort Consortium and directed the first analytical project in this consortium to quantify the association of body mass index (BMI) with total and cause-specific mortality. Data from ~1.1 million individuals recruited from 19 cohorts were harmonized in this project, which has served as the basis for most subsequent projects in this consortium. I also directed a project to quantify the burden of mortality due to tobacco smoking in Asia, providing scientific evidence for designing and implementing comprehensive smoking control programs in Asian countries, many of which are in a full-fledged tobacco epidemic. In addition, using data from cohort studies, I evaluated the combined impact of multiple lifestyle and dietary factors on total and cause-specific mortality, providing data for preventive measures to reduce mortality.

- a. **Zheng W**, McLerran DF, et al. Association between body-mass index and risk of death in more than 1 million Asians. N Engl J Med 2011;364(8):719-29. PMCID: PMC4008249.
- b. **Zheng W**, McLerran DF, Rolland BA, et al. Burden of total and cause-specific mortality related to tobacco smoking among adults aged ≥45 years in Asia: A pooled analysis of 21 cohorts. PLoS Med. 2014;11(4):e1001631. PMCID: PMC3995657.
- c. Nechuta SJ, other authors, **Zheng W**. Combined impact of lifestyle-related factors on total and cause-specific mortality among Chinese women: prospective cohort study. PLoS Med 2010;7(9) e1000339. PMCID: PMC2939020.
- d. Yang JJ, Yu D, Wen W, Shu XO, other authors, **Zheng W**. Tobacco Smoking and Mortality in Asia: A Pooled Meta-analysis. JAMA Network Open 2019;2(3):e191474. PMCID: PMC6450311.

URL to published work:

<http://www.ncbi.nlm.nih.gov/sites/myncbi/wei.zheng.3/bibliography/40838655/public/?sort=date&direction=descending>

D. Research Support

Ongoing

R01 CA202981 (Zheng/Haiman/Palmer) 07/01/16 – 6/30/21 **Contact MPI**

NIH/NCI: Breast cancer genetic study in African-ancestry populations

To search for genetic variants/genes for breast cancer risk and understand how germline variants affect tumor behaviors.

U01 CA202979 (Blot W/Zheng W/Shrubsole MJ) 07/21/16 - 06/30/21 **MPI**

NIH/NCI: Southern Community Cohort Study

To support the infrastructure of a large cohort study including ~86,000 adults for long-term studies of lifestyle and biomarkers for cancer and other chronic diseases

R01 CA235553 (Zheng W/Long JR) 07/01/19 - 6/30/24 **Contact MPI**

NIH/NCI: Integrating genomic and transcriptomic data to identify breast cancer susceptibility genes

To conduct a multi-ancestry study to discover breast cancer susceptibility genes

R01 CA188214 (Zheng W/Long JR) 09/01/14 - 8/31/20 (NCE) **Contact MPI**

NIH/NCI: Colorectal cancer risk loci: GWAS, fine-mapping, and functional analysis

To discover and functionally characterize genetic susceptibility loci for colorectal cancer risk

R01 CA228156 (Yao/Carpten/Palmer/Zheng) 02/01/19 - 01/31/24 MPI
NIH/NCI: Somatic mutations & their etiological determinants for breast cancer in African American women
To describe the somatic mutation landscape for breast cancer in African American women and investigate genetic and lifestyle determinants for these mutations

P30 CA068485 (Pietenpol) 09/01/20 - 08/31/25 Program co-leader
NCI: Cancer Center Support Grants
To support Vanderbilt-Ingram Cancer Center research infrastructure.

To improve the understanding of colorectal cancer etiology and identify novel biomarkers for CRC risk
R37CA227130 (Guo) 09/04/2018-08/31/22 Co-I
NIH/NCI: Transcriptome-wide association study to identify susceptibility genes for colorectal cancer
To integrate transcriptome, genetic regulation, GWAS data and in vitro assays to discover candidate susceptibility genes for colorectal cancer

UM1 CA182910 (Zheng W) 09/01/14 - 08/31/20 (NCE) PI
NIH/NCI: Shanghai Women's Health Study (SWHS)
To continue the follow-up of ~75,000 cohort members and collect additional data and biological samples

Completed Recently

K99/R00 CA215360 (Khankari) 09/18/17 – 08/31/22 Mentor*
NIH/NCI: Polyunsaturated fatty acids and colorectal tumor risk
To investigate polyunsaturated fatty acids and related biomarkers in relation to colorectal cancer risk

K99/R00 CA230205 (Shu X) 04/01/19 - 03/31/24 Mentor*
NIH: Uncovering roles of metabolites in colorectal cancer etiology

K99/R00 CA207848 (Warren Anderson) 07/01/16 - 06/30/21 Mentor*
NCI: Vitamin D and colorectal cancer risk: An integrated molecular and genetic epidemiology study
To investigate the potential causal association between vitamin D metabolites and colorectal cancer risk

K07CA218247 (Kuks) 04/01/2018-03/31/22 Mentor
NIH/NCI: Human papilloma virus-specific biomarkers for the prediction of oropharyngeal cancer recurrence
To improve HPV patient outcomes by using molecular markers (*recruited recently by other institution to lead a population science program*).

R01CA207466 (Cai) 07/01/2016-06/30/20 Co-I
NCI: Oral microbiome and lung cancer risk
To investigate the oral microbiome in relation to lung cancer risk

R01 CA158473 (Zheng W) 05/12/12 - 03/31/19 PI
NIH/NCI: Genome sequencing to identify novel genetic factors for breast cancer risk.
To search for low frequency risk variants for breast cancer risk through exome sequencing.

R01 CA148677 (Zheng W/Long JR) 02/15/11 - 01/31/18 Contact MPI
NIH/NCI: Consortium study to identify breast cancer susceptibility loci
To conduct a large consortium project to identify novel breast cancer susceptibility loci and genes

R01CA174853 (Epplein M) 07/01/13 – 08/31/18 Co-I
NIH/NCI: Helicobacter pylori blood biomarkers for gastric cancer in East Asia
To conduct a consortium study to validate blood H. pylori biomarkers for gastric cancer risk

****Served as the primary mentor for the K99-funded period. These mentees are now independent investigators.***