BIOGRAPHICAL SKETCH

NAME: **Wolf, Patricia G.**

eRA COMMONS USER NAME (credential, e.g., agency login): **PATRICIA_WOLF**

POSITION TITLE: **Assistant Professor of Nutrition Science**

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	Completion Date	FIELD OF STUDY
State University of New York College at Buffalo	BA	05/2006	Biology
University of Illinois, Urbana-Champaign	PhD	12/2018	Nutritional Sciences
University of Illinois, Urbana-Champaign	RDN	04/2019	Dietetics
University of Illinois, Chicago	Postdoc	01/2022	Nutrition/Microbiology
University of Illinois, Urbana-Champaign	Postdoc	08/2022	Nutrition/Microbiology

A. Personal Statement

My long-term research interest is to investigate microbial mechanisms of health disparities related to food quality and access, which could be ameliorated by diet and lifestyle interventions and social policy. My experience in industry, research, and dietetics has given me a strong foundation in nutritional biochemistry, human and microbial metabolism, and medical nutrition therapy. In industry, I used cell culture and microbial techniques to assess quality in gene therapy vectors, food, and cosmetic products. My pre-doctoral training focused on determining dominant forms of microbial hydrogen cycling in the human gut related to constipation-predominant irritable bowel syndrome. My dissertation work led to the finding that hydrogen sulfide (H_2S)-producing bacteria are a novel biomarker for colorectal cancer (CRC) in Black Americans. In my postdoctoral training, I studied microbial enzymes that produce physiologically important metabolites in the colon and quantified the abundance of these microbial metabolites and their effects on the host. I am now transitioning to an independent line of research, studying the metabolic functionality of the human gut microbiome to identify key host-microbe interactions related to cancer disparities that might be mitigated through targeted nutrition interventions.

Ongoing and recently completed projects that I would like to highlight include:

- **American Institute for Cancer Research** Wolf (PI) 01/01/2026-12/31/2027
  Regulation of endogenous and microbial tryptophan metabolism through a Mediterranean diet as a strategy to reduce CRC disparities
  A Mediterranean dietary pattern has a unique amino acid profile which may drive endogenous and microbial metabolism toward a protective milieu. Thus, we will leverage samples and data from our ongoing studies to determine barriers to Mediterranean diet adherence in the food environment, impacts of a Mediterranean diet on endogenous and microbial tryptophan metabolism, and effects of dietary cysteine on microbial tryptophan metabolism.

- **Regenstrief Center for Healthcare Engineering** Wolf (PI) 04/01/2024-09/01/2025
  Understanding the activity of tryptophanase harboring bacteria as a mechanism of colorectal cancer disparities
  To generate preliminary data we will develop a DNA-SIP assay to trace the fate of tryptophan into the DNA of the metabolically active gut bacteria and downstream metabolites (indole and 5-HT) to characterize differences in the populations and genomic content of tryptophanase-harboring bacteria, and the influence of cysteine, using stool samples from our CRC risk cohort.

- **American Cancer Society** Wolf (PI) 01/01/2024 - 12/31/2027
  The food environment, microbial cysteine metabolism, and cancer disparities

This work will determine if inadequate access to fresh or minimally processed foods may increase intake of foods high in cysteine, thereby supporting the growth of gut bacteria that produce H_2S from cysteine metabolism. Additionally, we will perform a randomized cross-over feeding trial to explore whether reduced cysteine intake decreases markers of cysteine metabolism and inflammation commonly associated with CRC.

- **Showalter Trust** Wolf (PI) 07/01/2023 - 12/31/2024
  Determining associations between oral cysteine exposure and bacteria that produce genotoxic hydrogen sulfide via cysteine metabolism. The proposed work hypothesizes that oral exposure to products abundant in cysteine will support the growth of oral bacteria that produce H_2S from cysteine metabolism. This enrichment of CMB in the oral cavity may augment the growth of CMB in the human gut, resulting in both localized and systemic inflammation associated with CRC risk.

Citations:

1. Byrd D, **Wolf PG**. The microbiome as a determinant of racial and ethnic cancer disparities. Nat Rev Cancer- In Press.
2. **Wolf PG**, Cowley ES, Breister A, Matatov S, Lucio L, Polak P, Ridlon JM, Gaskins HR, Anantharaman K. Diversity and distribution of sulfur metabolism in the human gut microbiome and its association with colorectal cancer. Microbiome. 2022 Apr 19;10(1):64. PMID: 35440042
3. **Wolf PG (corresponding author),** Byrd DA, Cares K, Odoms-Young A, Gaskins HR, Ridlon JM, Tussing-Humphreys L**.** Bile acids, gut microbes, and the neighborhood food environment - a potential driver of colorectal cancer health disparities. mSystems. 2022 Feb 22;7(1):e0117421. PMID: 35103491
4. **Wolf PG (Co-first author),** Yazici C, Kim H, Cross TW, Vermillion K, Carroll T, Augustus GJ, Mutlu E, Tussing-Humphreys L, Braunschweig C, Xicola RM, Jung B, Llor X, Ellis NA, Gaskins HR**.** Race dependent association of sulfidogenic bacteria with colorectal cancer. *Gut*. 2017 Nov;66(11):1983-1994. doi: 10.1136/gutjnl-2016-313321. Epub 2017 Feb 2. PubMed PMID: 28153960

B. Positions, Scientific Appointments, and Honors

Positions and Employment

2022 – Present	Assistant Professor, Department of Nutrition Science, Purdue University, West Lafayette, IN
2022	Postdoctoral Research Associate, Animal Sciences, University of Illinois, Urbana, IL
2019 – 2022	Postdoctoral Fellow, Cancer Education and Career Development Program (T32CA057699), University of Illinois, Chicago, IL
2013 – 2018	Research Assistant, Division of Nutritional Sciences, University of Illinois, Urbana, IL
2007 – 2013	Microbiologist, Conair Corporation, Rantoul, IL
2007	Lab Technician, Vector Production Facility, IU School of Medicine, Indianapolis, IN
2006 – 2008	Quality Assurance Technician, Independent Contractor, Diamond Foods, Fishers, IN
2005 – 2006	Independent Research, State University of New York College at Buffalo, Buffalo, NY

Other Experience and Professional Memberships

2024	Reviewer, ACS Grant Review Panel
2024 – Present	Reviewer, Genes and Diseases
2024 – Present	Reviewer, Amino Acids
2023 – Present	Reviewer, AICR Grant Review Panel
2022 – Present	At-Large Delegate, Early Career Nutrition Interest Group, American Society for Nutrition
2022 – Present	Reviewer, Nature Communications
2022 – Present	Reviewer, Nutrition Research
2022 – Present	Reviewer, Frontiers in Nutrition
2021 – Present	Member, Microbes and Social Equity Working Group
2021 – Present	Reviewer, Applied Environmental Microbiology
2021 – Present	Reviewer, Microorganisms
2021 – Present	Reviewer, Microbiome
2019 – Present	Reviewer, Gut Microbes
2019 – Present	Reviewer, mSystems
2019 – 2020	Reviewer, PLOS One
2019 – Present	Member, American Association for Cancer Research
2016 – Present	Member, Academy of Nutrition and Dietetics

2016 – 2017 Reviewer, FEMS Microbiology Ecology
2014 – Present Member, American Society for Microbiology
2014 – Present Member, American Society for Nutrition

Honors

2026 Vernon Young International Award for Amino Acid Research, American Society for Nutrition
2019 Postdoctoral Travel Award, University of Illinois, Chicago, IL
2019 NIAID/NCATS, Scholarship, Keystone Symposia- Microbiome: Therapeutic Implications
2018 Graduate Research Award, College of Agricultural, Consumer, and Environmental Sciences, University of Illinois, Urbana, IL
2017 Finalist, ASN Emerging Leaders in Nutritional Science Poster Competition, Experimental Biology
2016 Graduate College Travel Award, The Graduate College, University of Illinois, Urbana, IL
2016 Margin of Excellence Travel Grant, Division of Nutritional Sciences, University of Illinois, Urbana, IL
2016 Frank W. Kari Memorial Award, Division of Nutritional Sciences, University of Illinois, Urbana, IL
2015 Toshiro Nishida Research Award, Division of Nutritional Sciences, University of Illinois, Urbana, IL
2015 Margin of Excellence Travel Grant, Division of Nutritional Sciences, University of Illinois, Urbana, IL
2015 Early Investigator Award, American Gastroenterological Association, Digestive Disease Week 2015
2014 Teacher Ranked as Excellent, University of Illinois, Urbana, IL
2014 Gamma Sigma Delta Honors Society, University of Illinois, Urbana, IL
2013 Teacher Ranked as Excellent (ranked as outstanding), University of Illinois, Urbana, IL

C. Contributions to Science

1. **Hydrogen Metabolism and Colonic Disease**. During my graduate training, my first major line of inquiry centered on microbial hydrogen cycling. Production and consumption of molecular hydrogen is central to the dominant forms of microbial metabolism in the human gastrointestinal tract and linked to human health and disease. For example, previous studies have associated elevated breath hydrogen and methane (produced by microbial hydrogen consumption) is associated with slow colonic transit affiliated with constipation predominant irritable bowel syndrome (IBS-C). However, the relationship between colonic microbiota, transit, and breath tests was unclear. My work revealed that colonic mucosal but not fecal hydrogenogenic and hydrogenotrophic genes were more abundant in constipated versus healthy subjects independent of colonic transit. Since the hydrogenases and pathways responsible for hydrogen cycling in the human gastrointestinal tract were incompletely understood, we partnered with Chris Greening, an expert who developed a comprehensive classification scheme for hydrogenases, to perform the first comprehensive bioinformatic insight into mechanisms of hydrogen metabolism in the human colon. This work revealed that over 70% of gut microbes had the genetic capacity to metabolize hydrogen and the novel observation that electron-bifurcation rather than microbial respiration may be the dominant mechanism of hydrogen re-oxidation in the human gut.

    a. Welsh C, Cabotaje PR, Marcelino VR, Watts TD, Kountz DJ, Jespersen M, Gould JA, Doan NQ, Lingford JP, Koralegedara T, Solari J, D'Adamo GL, Huang P, Bong N, Gulliver EL, Young RB, Land H, Walter K, Cann I, Pereira GV, Martens EC, **Wolf PG**, Ridlon JM, Gaskins HR, Giles EM, Lyras D, Lappan R, Berggren G, Forster SC, Greening C. A widespread hydrogenase supports fermentative growth of gut bacteria in healthy people. *Nat Microbiol*. 2025 Nov;10(11):2686-2701. PMID: 41131367
    b. **Wolf PG**, Parthasarathy G, Chen J, O'Connor HM, Chia N, Bharucha AE, Gaskins HR. Assessing the colonic microbiome, hydrogenogenic and hydrogenotrophic genes, transit and breath methane in constipation. *Neurogastroenterology and Motility*, Oct;29(10):1-9. doi: 10.1111/nmo.13056. Epub 2017 Mar 13. PMID: 28295896
    c. **Wolf PG,** Biswas A, Morales SE, Greening C, Gaskins HR. H_2 metabolism is widespread and diverse among human colonic microbes. *Gut Microbes,* 2016 Apr 28:0. PMID: 27123663
    d. Parthasarathy G, Chen J, Chen X, Chia N, O'Connor HM, **Wolf PG**, Gaskins HR, Bharucha AE. Relationship between microbiota of the colonic mucosa vs feces and symptoms, colonic transit, and methane production in female patients with chronic constipation. *Gastroenterology* 2016 Feb;150(2):367-379. PMID: 26460205

2. **Microbial Sulfur Metabolism and Colorectal Cancer.** Microbial sulfur metabolism results in the production of hydrogen sulfide, a potent genotoxin implicated as an environmental trigger of colorectal cancer. In my dissertation work, we showed that high-fat feeding increases the abundance of sulfidogenic bacteria in the mucosa of mice, this abundance is associated with systemic and inflammatory responses, and these responses may be attenuated by grape consumption. We then determined that the abundance of sulfidogenic bacteria is significantly higher in Black participants who have higher risk for developing CRC that other races and ethnicities, that sulfidogenic bacteria are associated with dietary intake, and that sulfidogenic bacteria that metabolize organic sources of sulfur are a significant marker for this disease among Black individuals. Since the field has mostly focused upon two major pathways of microbial sulfur metabolism, we partnered with Karthik Anantharaman to determine the diversity and distribution of bacteria in the human gut with the capacity to perform sulfur metabolism. We demonstrated that genes for sulfur metabolism were more abundant and diverse than previously studied, identified potential novel pathways for microbial taurine reduction, and revealed that genes for cysteine metabolism are widespread and abundant in the human microbiome and significantly associated with CRC.

    a. **Wolf PG,** Gaskins HR, Ridlon JM, Freels S, Hamm A, Goldberg S, Petrilli P, Schering T, Vergis S, Gomez-Perez S, Yazici C, Braunschweig C, Mutlu E, Tussing-Humphreys L. Effects of taurocholic acid metabolism by gut bacteria: A controlled feeding trial in adult African American subjects at elevated risk for colorectal cancer. *Contemp Clin Trials Commun*. 2020 Jul 19:100611. PMID: 32695922
    b. **Wolf PG**, Kolosslov V, Zhou Z, Ly L, Doden H, Devendran S, Breister A, Lucio L, Polak P, Matatov M, Anantharaman K, Ridlon JM, Gaskins HR. The colorectal cancer associated microbe *Odoribacter splanchnicus* produces genotoxic hydrogen sulfide via cysteine metabolism [abstract]. In: Proceedings of the Annual Meeting of the American Association for Cancer Research 2020; 2020 Apr 27-28 and Jun 22-24. Philadelphia (PA): AACR; Cancer Res 2020;80(16 Suppl): Abstract nr 3342.
    c. Ridlon JM, **Wolf PG,** Gaskins HR. Taurocholic acid metabolism by gut microbes and colon cancer. *Gut Microbes,* 2016 Mar 22:1-15. PMID: 27003186
    d. Shen W, **Wolf PG**, Carbonero F, Zhong W, Reid T, Gaskins HR, McIntosh MK. Intestinal and systemic inflammatory responses are positively associated with sulfidogenic bacteria abundance in high-fat-fed male C57BL/6J mice. *J Nutr* 2014 Aug;144(8):1181-7. PMID: 24919690.

3. **Microbial Enzymes and Cancer Associated Metabolites**. My graduate training focused on the genetic potential of the gut microbiome to produce metabolites associated with colonic disease. However, much remains unknown about the functional capacity of the gut microbiota particularly in context of varying dietary substrate. Thus, to make meaningful associations between bacterial composition and cancer risk it is necessary to resolve the diversity of bacteria and their enzymes that induce cancer progression through the production of pro-inflammatory metabolites. To contribute to this effort, my postdoctoral training focused on bacterial gene discovery, protein characterization, and metabolomics with a particular emphasis on bacterial steroid and sulfur metabolism. During this work, we discovered the enzyme by which that the CRC associated bacterium *Odoribacter splanchnicus* produces hydrogen sulfide via cysteine metabolism. We also investigated the impact of the nutraceutical berberine on the gene expression of a defined consortium of gut bacteria capable of metabolizing bile acids.

    a. **Wolf PG**, Welsh C, Binion B, Dai H, Oliveira ML, Hamm A, Goldberg S, Buobu PS, Schering T, Vergis S, Kessee N, Gomez SL, Yazici C, Maienschein-Cline M, Byrd DA, Gaskins HR, Ridlon JM, Mutlu E, Greening C, Tussing-Humphreys L. Secondary Bile Acid Derivatives Are Contributors to the Fecal Bile Acid Pool and Associated With Bile Acid-Modulating Nutrients. *J Nutr*. 2025 Mar;155(3):826-838. PMID: 39805403
    b. **Wolf PG**, Penalver Bernabe B, Lima Oliveira M, Hamm A, McLeod A, Olender S, Castellanos K, Loman BR, Gaskins HR, **Fitzgibbon M**, Tussing-Humphreys L. Effect of Iron Feeding from Food-Based Sources on the Gut Microbiota and Intestinal Inflammation: A Crossover Feeding Study Among Older Obese Women. *Nutr Cancer.* 2023;75(3):876-889. PMID: 36625531;
    c. **Wolf PG**, Devendran S, Doden H, Ly L, Moore T, Takei H, Nittono H, Murai T, Kurosawa T, Chlipala GE, Green SJ, Kakiyama G, Kashyap P, McCracken V, Gaskins HR, Gillevet PM, Ridlon JM. Network modeling of bile acid metabolomics and cecal bacterial metatranscriptomic responses to berberine in a gnotobiotic mouse model constituted with the B4PC2 human microbial consortium. *BMC Microbiol.* 2021 Jan 11;21:24. PMID: 33430766

d. Doden HL, **Wolf PG**, Gaskins HR, Anantharaman K, Alves JMP, Ridlon JM. Completion of the gut microbial epi-bile acid pathway. *Gut Microbes.* 2021 Jan 1;13(1):1-20. PMID: 33938389

4. **Nutrition Inequity and Cancer.** As a practicing Registered Dietitian Nutritionist, it is evident to me that long term health and quality of life are linked to dietary choices. However, those suffering from cancer disparities face unique barriers to nutrition quality and access that limit healthful dietary options. I propose that understanding the interactions between microbial metabolism and cancer health disparities requires framing them in a social context. Thus, I have partnered with likeminded researchers interested in understanding layered mechanisms of human disease that accounts for social and structural barriers faced by underserved communities and using the data from this work to inform social policy. I am a corresponding author on an article in *Translational Behavioral Medicine* urging support for policies that improve the local food environment to mitigate cancer health disparities. Furthermore, I co-authored a commentary introducing the Microbes and Social Equity Working Group, a global collaboration led by Sue Ishaq of over 90 researchers interested in using their diverse expertise to solve problems regarding microbes and social equity. I helped organize the Microbes and Social Equity Virtual Symposium, and recently led a recent review regarding nutrition equity, microbial metabolism, and cancer disparities. This will set the stage for my independent work that will investigate associations between social and structural barriers, dietary and lifestyle behaviors, microbial metabolism, and cancer risk.

   a. Hamm A, Karayeva E, Oliveira ML, Kahouadji N, Grippo P, **Wolf PG**, Mutlu E, Tussing-Humphreys L, **Kim SJ**. Neighborhood homicide rate and odds of colorectal adenoma among adult patients seeking colonoscopy. JNCI Cancer Spectr. 2024 Nov 1;8(6):pkae110. PMID: 39471492
   b. **Wolf PG**, **Kim S**, Tussing-Humphreys L. Socioenvironmental stressors, the gut microbiome and colorectal cancer inequities – A Chicago perspective. *Am J Gastroenterol.* 2023 May 1;118(5):765-768. PMID: 36689734.
   c. **Wolf PG (corresponding author),** Sanchez-Flack JC, Buscemi J, **Fitzgibbon ML**, Gaskins HR, Ridlon JM, **Kim S,** Tussing-Humphreys L. Support policies that foster a healthy food environment and incentivize healthy food purchases to mitigate cancer inequities. *Transl Behav Med*. 2021 Jul 5:ibab081. PMID: 35103491
   d. **Wolf PG**, Manero J, Harold KB, Chojnacki M, Kaczmarek J, Liguori C, Arthur A. Educational video intervention improves knowledge and self-efficacy in identifying malnutrition among healthcare providers in a cancer center: a pilot study. *Support Care Cancer*. 2020 Feb;28(2):683-9. PMID: 31123871.

Complete List of Published Work in MyBibliography:
https://www.ncbi.nlm.nih.gov/myncbi/patricia.wolf.1/bibliography/public/