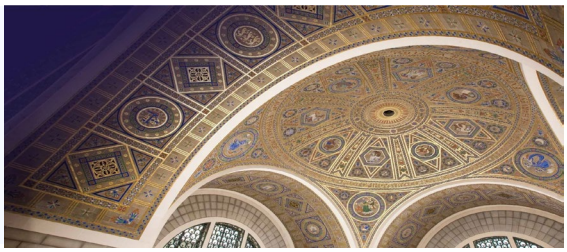
NATIONAL ACADEMIES Sciences Engineering Medicine

Board on Agriculture and Natural Resources

Exploring Linkages Between Soil Health and Human Health

Meeting 8 (Virtual) – July 17-18, 2023

Public Agenda



MONDAY, JULY 17, 2023 (ET)

Purpose The session will focus on food processing and the human gut microbiome.

Open session

2:00 **Welcome**

Diana H. Wall, Committee Chair & Session Moderator, Colorado State University

2:10 **Overview of the National Academies study process**

Kara Laney, Study Director, National Academies of Sciences, Engineering, and Medicine

2:20 **Invited presentation**

Bruce Hamaker, Professor of Food Science and Director of the Whistler Center for Carbohydrate Research, Purdue University

Dietary fiber and food processing links to the gut microbiome and human health

2:40 **Speaker discussion with the committee**

3:00 **Open session adjourns**

TUESDAY, JULY 18, 2023 (ET)

Purpose The session will focus on the human gut microbiome.

Open session

1:30 **Welcome**

Diana H. Wall, Committee Chair & Session Moderator, Colorado State University

1:40 **Overview of the National Academies study process**

Kara Laney, Study Director, National Academies of Sciences, Engineering, and Medicine

1:50 **Invited presentation: The impact of industrialization and diet on the gut microbiome**

Justin and Erica Sonnenburg, Department of Microbiology and Immunology, Stanford University, School of Medicine

The impact of industrialization and diet on the gut microbiome

2:10 **Speaker discussion with the committee**

2:30 **Open session concludes**

SPEAKER BIOs

BRUCE HAMAKER, PURDUE UNIVERSITY

Bruce R. Hamaker is Distinguished Professor of Food Science at Purdue University, West Lafayette, Indiana. He also holds the Roy L. Whistler Chair and is Director of the Whistler Center of Carbohydrate Research. He obtained his undergraduate degree in biological sciences from Indiana University; his graduate studies were in human nutrition (M.S.) and food chemistry (Ph.D.) from Purdue University, and post-doctoral study at the Instituto de Investigacion Nutricional in Lima, Peru (supervisor, George Graham, Johns Hopkins University). He was in the U.S. Peace Corps in Liberia, West Africa from 1977-1979. He has over 300 refereed publications in food science, human nutrition, biochemistry and broad-spectrum journals, as well as numerous book chapters. He has advised over 70 M.S and Ph.D. students and 29 post-doctoral scientists. Bruce's research is known in the area of food carbohydrates with emphasis on dietary fibers and the gut microbiome, and glycemia and physiological systems. He also works in development-oriented research and applied programs in West and East Africa and Latin America.

ERICA SONNENBURG, STANFORD UNIVERSITY

Dr. Sonnenburg is a senior research scientist in the Department of Microbiology and Immunology at the Stanford University School of Medicine.

JUSTIN SONNENBURG, STANFORD UNIVERSITY

Dr. Sonnenburg is a professor in the Department of Microbiology and Immunology at the Stanford University School of Medicine and the recipient of the NIH Director's New Innovator Award and Pioneer Award and the AGA Research Mentor Award.

Justin and Erica are the authors of the book *The Good Gut: Taking Control of Your Weight, Your Mood, and Your Long-Term Health*. Their laboratory at Stanford, which has published their findings in top journals including *Nature*, *Science*, and *Cell*, develops and employs diverse technologies to understand basic principles that govern interactions within the intestinal microbiota and between the microbiota and the host. An ongoing objective of the research program is to devise and implement innovative strategies to prevent and treat disease in humans via the gut microbiota.

SONNENBURG LAB RESEARCH

The goals of the Sonnenburg Lab research program are to (i) elucidate the basic mechanisms that underlie dynamics within the gut microbiota and (ii) devise and implement strategies to prevent and treat disease in humans via the gut microbiota. We investigate the principles that govern gut microbial community function and interaction with the host using experimental systems ranging from gnotobiotic mice to humans. We pursue molecular mechanisms of host-microbial interaction using an array of technologies including gnotobiotic and conventional mouse models, quantitative imaging, molecular genetics and synthetic biology, and a metabolomics pipeline focused on defining microbiota-dependent metabolites. The synergy of these diverse techniques provides insight into the dynamics of a microbial ecosystem in response to cues ranging from nutrition to pathogen-induced inflammation. Studies of microbiomes diverse human cohorts, ranging from indigenous populations in Africa, Asia, and South America to dietary intervention trials in cohorts of U.S. residents, have provided great insight into microbiome dynamics and fuel a pipeline of reverse translational studies.