



## Human Nutrition: 2020 Edition



# Human Nutrition: 2020 Edition

*UNIVERSITY OF HAWAII AT MĀNOA  
FOOD SCIENCE AND HUMAN  
NUTRITION PROGRAM*

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University of Hawai'i at Mānoa Food Science and  
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Attributions

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# Preface

UNIVERSITY OF HAWAII AT MĀNOA FOOD SCIENCE AND HUMAN  
NUTRITION PROGRAM AND HUMAN NUTRITION PROGRAM

‘A‘ohe pau ka ‘ike i ka hālau ho‘okahi  
Knowledge isn’t taught in all one place

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This open access textbook was developed as an introductory nutrition resource to reflect the diverse dietary patterns of people in Hawai‘i and the greater Pacific. Using the ‘ōlelo no‘eau, or Hawaiian proverb, stated above, we believe that the principles of nutrition should be taught through the context of our communities and environments. Its intended audience are students from the University of Hawai‘i at Mānoa enrolled in the Food Science and Human Nutrition (FSHN) 185 course, The Science of Human Nutrition. However, this open access textbook may be of interest to other courses interested in teaching nutrition through a Hawai‘i-Pacific framed lens. This book is best viewed online using the pressbooks format however, multiple formats (e.g., pdf, epub, mobi) are also made available.

# About the Contributors

UNIVERSITY OF HAWAII AT MĀNOA FOOD SCIENCE AND HUMAN  
NUTRITION PROGRAM AND HUMAN NUTRITION PROGRAM

This open access textbook was made possible through the collaboration of faculty, students and staff at the University of Hawai'i at Mānoa demonstrating the value of working together, ho'okahi ka 'ilau like ana.

## Faculty

Jennifer Draper



Jennifer Draper is a Lecturer in the Department of Human Nutrition, Food and Animal Sciences. She received her MA in Nutrition Science from the University of Texas at Austin. She is a Registered Dietitian in private practice specializing in eating disorders and emotional over-eating. She enjoys interacting with students and is passionate about helping people have a healthy relationship with food and their bodies.

## Marie Kainoa Fialkowski Revilla



Marie Kainoa Fialkowski Revilla is a Native Hawaiian faculty member in the Department of Human Nutrition, Food, and Animal Sciences at the University of Hawai'i at Mānoa. She teaches a number of courses in nutrition both face to face and online. She is dedicated to developing readily available and accessible nutrition education materials and curricula that reflect Hawai'i and the Pacific to ensure that her students can relate to the content being learned. She enjoys spending time with her 'ohana (family) at their home in Ahuimanu on the island of O'ahu.

## Alan Titchenal



Dr. Titchenal received a PhD in nutrition from the University of California at Davis with emphasis on exercise physiology and physiological chemistry. His work at the University of Hawai'i at Mānoa has focused on the broad areas of nutrition and human performance and translation of nutrition science for public consumption. This has included the "[Got Nutrients?](#)" project that provides daily messages on topics related to nutrition, fitness, and health and the publication of over 600 articles in the [Honolulu Star-Advertiser](#) newspaper.

## Students

### Noemi Arceo Caacbay



Noemi Arceo Caacbay is a Masters Student in the Public Health, Health Policy and Management Program at the University of Hawai'i at Mānoa. She enjoys learning about all things health-science related. She is passionate about returning to her home of Saipan, CNMI where she will give back and serve her community.

## Allison Calabrese



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## Skylar Hara



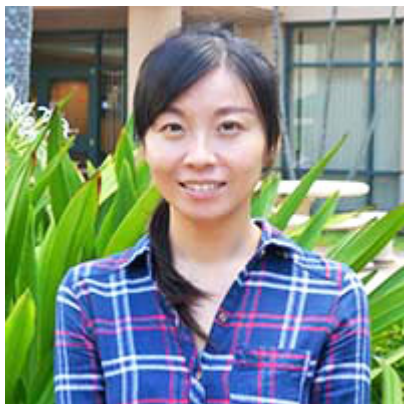
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## Note to Educators Using this Resource

Please send edits and suggestions directly to Dr. Fialkowski Revilla on how we may improve the textbook. We also welcome others to adopt the book for their own course needs, however, we would like to be able to keep a record of users so that we may update them on any critical changes to the textbook. Please contact Dr. Fialkowski Revilla if you are considering to adopt the textbook for your course.

# Acknowledgements

UNIVERSITY OF HAWAII AT MĀNOA FOOD SCIENCE AND HUMAN NUTRITION PROGRAM AND HUMAN NUTRITION PROGRAM

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- Chapter 8 Energy
- Chapter 12 Nutrition Applications
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- Chapter 14 Lifespan Nutrition During Childhood and Adolescence
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PART I

# CHAPTER 1. BASIC CONCEPTS IN NUTRITION



# Introduction

UNIVERSITY OF HAWAII AT MĀNOA FOOD SCIENCE AND HUMAN  
NUTRITION PROGRAM AND HUMAN NUTRITION PROGRAM

*‘O ke kahua ma mua, ma hope ke kūkulu*

*The foundation comes first, then the building*

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## *Learning Objectives*

By the end of this chapter, you will be able to:

- Describe basic concepts in nutrition
- Describe factors that affect your nutritional needs
- Describe the importance of research and scientific methods to understanding nutrition

## **What are Nutrients?**

The foods we eat contain nutrients. Nutrients are substances required by the body to perform its basic functions. Nutrients must be obtained from our diet, since the human body does not synthesize or produce them. Nutrients have one or more of three basic functions: they provide energy, contribute to body structure, and/or regulate chemical processes in the body. These basic functions allow us to detect and respond to environmental surroundings, move, excrete wastes, respire (breathe), grow, and reproduce. There are six classes of nutrients required for the body to function and maintain overall health. These are carbohydrates, lipids, proteins, water, vitamins, and minerals. Foods also contain non-nutrients that may be harmful (such as natural toxins common in plant foods and additives like some dyes and preservatives) or beneficial (such as antioxidants).