



Encyclopedia of

FOOD MICROBIOLOGY

Second Edition



EDITED BY

Carl A. Batt

Mary-Lou Tortorello



ENCYCLOPEDIA OF **FOOD MICROBIOLOGY**

SECOND EDITION

VOLUME 1

A–F

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ENCYCLOPEDIA OF FOOD MICROBIOLOGY

SECOND EDITION

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VOLUME 1



ELSEVIER

Amsterdam • Boston • Heidelberg • London • New York • Oxford
Paris • San Diego • San Francisco • Singapore • Sydney • Tokyo

Academic Press is an imprint of Elsevier



Academic Press is an imprint of Elsevier
32 Jamestown Road, London NW1 7BY, UK
30 Corporate Drive, Suite 400, Burlington MA 01803, USA
525 B Street, Suite 1800, San Diego, CA 92101-4495, USA

First edition 2000

Second edition 2014

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British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data

A catalog record for this book is available from the Library of Congress

ISBN: 978-0-12-384730-0

For information on all Elsevier publications
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Printed and bound in Poland

14 15 16 17 18 10 9 8 7 6 5 4 3 2

The blind-embossed *E. coli* image on the front cover has been provided by Dennis Kunkel Microscopy, Inc. (www.denniskunkel.com)



Editorial: Zoey Ayres, Simon Holt
Production: Justin Taylor

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EDITOR-IN-CHIEF



Carl A. Batt joined the faculty in the College of Agriculture and Life Sciences at Cornell University in 1985. He is the Liberty Hyde Bailey Professor in the Department of Food Science. Prof. Batt also serves as Director of the Cornell University/Ludwig Institute for Cancer Research Partnership, he is a co-Founder of Main Street Science, and the founder of Nanooze, an on-line science magazine for kids. He is also the co-Founder and former co-Director of the Nanobiotechnology Center (NBTC) – a National Science Foundation supported Science and Technology Center. Currently he is appointed as an Adjunct Senior Scientist at the MOTE Marine Laboratory in Sarasota Florida. His research interests are a fusion of biology and nanotechnology focusing on cancer therapeutics.

Prof. Batt received his Ph.D. from Rutgers University in Food Science. He went on to do post-doctoral work at the Massachusetts Institute of Technology. Throughout his 25 years at Cornell, Prof. Batt has worked at the interface between a number of disciplines in the physical and life sciences seeking to explore the development and application of novel technologies to applied science problems. He has served as a scientific mentor for more than 50 graduates students and over 100 undergraduates, many of whom now hold significant positions in academia, government and the private sector, both in the United States and throughout the world. Partnering with the Ludwig Institute for Cancer Research, Prof. Batt has helped to establish a Good Manufacturing Practices Bioproduction facility in Stocking Hall. This facility, the only one at an academic institution in the United States, is a state-of-the-art suite of clean rooms which is producing therapeutic agents for Phase I clinical trials. One therapeutic, NY-ESO-1 is in clinical trials at New York University and Roswell Park (Buffalo, NY). A second therapeutic SM-14 is about to enter clinical trials in Brazil.

Prof. Batt has published over 220 peer-reviewed articles, book chapters and reviews. In addition, from 1987–2000 he served as editor for *Food Microbiology*, a peer-reviewed journal and editor for the *Encyclopedia of Food Microbiology* that was published in 2000. In 1998, Prof. Batt cofounded a small biotechnology research and development company, Agave BioSystems, located in Ithaca, NY and continues to serve as its Science Advisor. From 1999–2002, Prof. Batt was the President of the Board of Directors of the Ithaca Montessori School, an independent, progressive community-based school. In 2004, he co-founded Main Street Science, a not-for-profit organization to develop hands-on science learning activities to engage the minds of students.

Prof. Batt has been a champion of bringing science to the general public, especially young students, and making difficult concepts approachable. Prof. Batt is the founder and editor of Nanooze, a webzine and magazine for kids that is focused on nanotechnology and has a distribution of over 100,000 in the United States. Prof. Batt is also the creator of Chronicles of a Science Experiment which is co-produced by Earth & Sky. He headed a team that developed two traveling museum exhibitions to share the excitement of emerging technology with the general public. The first exhibition, 'It's a Nanoworld' is currently on tour in the United States and has made stops including a six-month stay at Epcot in Disney World. The second exhibition, 'Too Small to See' began its tour at Disney World and is continuing to tour throughout the United States. More than two-million visitors have seen these exhibits. A third exhibition for long-term display at Epcot called 'Take a Nanooze Break' opened in February 2010 with a fourth 'Nanooze Lab' that opened at Disneyland in Anaheim CA in November 2011. The two Disney exhibits will reach in excess of 10M visitors each year.

EDITOR



Mary Lou Tortorello grew up in Chicago, IL, USA, and attended Northern Illinois University (B. S., Biological Sciences) and Loyola University of Chicago (M.S., Biological Sciences). She received a Ph.D. from the Department of Microbiology at Cornell University in 1983. Post-graduate work included gene transfer in *Enterococcus*, phage resistance in dairy starter cultures, rapid assays for detection of pathogens including *Listeria monocytogenes*, and teaching the undergraduate course, General Microbiology, at Cornell. Her background includes work at Abbott Laboratories as product manager of the confirmatory serum diagnostic test kit for the HIV/AIDS virus. Since 1991 she has been a research microbiologist with the U.S. Food and Drug Administration, Division of Food Processing Science and Technology, in Bedford Park, IL, USA, and is currently Chief of the Food Technology Branch. Her research interests include improvements in microbiological methods and

the behavior and control of microbial pathogens in foods and food processing environments. She is Co-Editor of the *Encyclopedia of Food Microbiology* and the *Compendium of Methods for the Microbiological Examination of Foods*. She serves on the Editorial Board of *Journal of Food Protection* and is Chief Editor of the journal *Food Microbiology*.

EDITORIAL ADVISORY BOARD



Frederic Carlin

Frédéric CARLIN (born 1962 in France) is Research Director at INRA, the French National Institute for Agricultural Research. He is currently working at the Mixed Research Unit 408 INRA – University of Avignon Safety and Quality of Products of Plant Origin, at the INRA research center Provence – Alpes – Côte d’Azur in Avignon. His research activity has been devoted to microbial safety and quality of minimally processed foods, in particular those made with vegetables, and to the problems posed by *Listeria monocytogenes* and the pathogenic spore-forming bacteria, *Bacillus cereus* and *Clostridium botulinum*. His field of interest also includes Predictive Microbiology and Microbial Risk Assessment. He has published more than 70 papers and book chapters on these topics. He is contributing editor for *Food Microbiology* and member of the editorial board of *International Journal of Food Microbiology*.



Ming-Ju Chen, Sr.

Ming-Ju Chen is a distinguished Professor at the University of National Taiwan University (NTU), Taiwan. At NTU, she has served as both the director of Center for International Agricultural Education and Academic Exchanges and the Chair of the Department of Animal Science and Technology. She earned the doctorate in Food Science and Technology at the Ohio State University and a Master Degree in Animal Science at National Taiwan University.

Dr. Chen’s research interests now include isolation and identification of new bacteria and yeasts from different resources and applications for these strains in human food and animal feed. She also involves the development of a new platform to evaluate the functionality of probiotics and study the possible mechanism and pathway. Dr. Chen has published over 100 papers in areas such as dairy science, microbiology, food science, and functional food. She also contributes more than seven book chapters.

Dr. Chen has achieved many external and professional awards and marks of recognition. She was awarded a Distinguished Research of National Science Council, Chinese Society of Food Science, and Taiwan institute of Lactic Acid Bacteria. She is a fellow of the Chinese Society of Animal Science. She also received Distinguished Teaching Award of National Taiwan University from 2005–2012.

Dr. Chen holds and has held a number of leadership roles. In Dec. 2013, she was elected as President of the Association of Animal Science and is the first female to be elected to that role. She was General Secretary of the Asian Federation of Lactic Acid Bacteria (2009–2013), and was General Secretary of the Association of World Poultry Science in Taiwan (2004–2008). She was executive secretary of the 9th International Asian Pacific Poultry Conference in Taipei in Nov. 2011.

Dr. Chen regularly speaks at international conferences, and is a member of a number of editorial boards of journals in her research area, including *Food Microbiology*, *American Journal of Applied Sciences* and *Chinese Animal Science*.



Maria Teresa Destro

Dr. Maria Teresa Destro is currently an Associate Professor of Food Microbiology in the Department of Food and Experimental Nutrition at the University of Sao Paulo (USP), Brazil, where she is responsible for teaching food microbiology to undergraduate and graduate students. She also delivered courses at several universities in Brazil and in other South American countries. Her research areas of interest are foodborne pathogens, with a special interest in *Listeria monocytogenes*, from detection and control to the influence of processing conditions on the virulence of the pathogen. She has served as lead investigator and collaborator in several multi-institutional projects addressing food safety and microbial risk assessment.

Dr. Destro has fostered extension and outreach activities by helping micro and small food producers implement GMP, HACCP programs, and by training private and official laboratory staff in *Listeria* detection and enumeration. As an FAO certified HACCP instructor, she has delivered courses all over Brazil. She has served on several Brazilian Government committees and works at the international level with FAO, ILSI North America, and PAHO.

Dr. Destro has been very active in several scientific associations including the International Association for Food Protection where she has been serving in different committees. Dr. Destro was responsible with others for the establishment of the Brazil Association for Food Protection, the first IAFP Affiliate organization in South America. She has also acted as an ambassador for IAFP in different Latin America countries, always committed to spreading the IAFP objective: advancing food safety worldwide.



Geraldine Duffy

Dr Geraldine Duffy holds a Bachelor of Science Degree from University College Dublin and a PhD from the University of Ulster, Northern Ireland. She has been Head of the Food Safety Department at Teagasc, Food Research Centre, Ashtown, Dublin, Ireland since 2005. Her research focuses on detection, transmission, behaviour and control of microbial pathogens, in particular verocytotoxigenic *E. coli*, *Listeria*, *Salmonella*, and *Campylobacter* along the farm to fork chain. She has published widely in the field of microbial food safety with over 80 peer reviewed publications including books and book chapters. Dr Duffy has considerable experience in the co-ordination of national and international research programmes and under the European Commission Framework Research Programme and has co-ordinated multi-national programmes on *E. coli* O157:H7 and is currently co-ordinating a 41 partner multinational European Union Framework integrated research project on beef safety and quality (Prosafbeef). She is a member of a number of professional committees including the scientific and microbiological sub-committee of the Food Safety Authority of Ireland and serves as a food safety expert for the European Food Safety Authority (EFSA) biohazard panel, W.H.O / FAO and I.L.S.I. (International Life Science Institute).



Danilo Ercolini

Danilo Ercolini was awarded his PhD in Food Science and Technology in 2003 at the University of Naples Federico II, Italy. In 2001 he was granted a Marie Curie Fellowship from the EU to work at the University of Nottingham, UK, where he spent one year researching within the Division of Food Science, School of Biosciences. He was Lecturer in Microbiology at the University of Naples from November 2002 to December 2011. He is currently Associate Professor in Microbiology at the Department of Agricultural and Food Sciences of the same institution.

He is author of more than 70 publications in peer-reviewed journals since 2001. His h-index is 27 and his papers have been cited more than 2000 times according to the Scopus database (www.scopus.com). He was book Editor of "*Molecular techniques in the microbial ecology of fermented foods*" published by Springer, New York – Food Microbiology and Food Safety series by M. Doyle.

He has been invited as a speaker or chairman at several international conferences. He is on the Editorial Board of *Applied and Environmental Microbiology*, *International Journal of Food Microbiology*, *Food Microbiology*, *Journal of Food Protection* and *Current Opinion in Food Science*. He is Associate Editor for *Frontiers in Microbiology*.

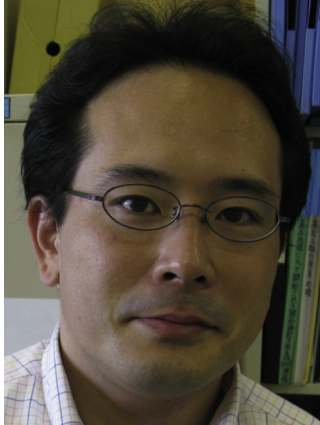
He has been responsible for several grants from the EU and Italian Government and has several ongoing collaborations with partners from industry. He was granted the Montana Award for Food Research in 2010. He is responsible of a high-throughput sequencing facility at the Department of Agricultural and Food Sciences at the University of Naples.

He has been working in the field of microbial ecology of foods for the last 12 years. His main activities include the development and exploitation of novel molecular biology techniques to study microorganisms in foods and monitor changes in microbiota according to different fermentation

or storage conditions applied to food products. The works include the study of microbial populations involved in the manufacture or ripening of fermented foods. In addition, he has studied diversity and metabolome of the spoilage microbiota of fresh meat during storage in different conditions including aerobic storage, vacuum, and antimicrobial active packaging.

The most recent interests include the study of food and human microbiomes by meta-omics approaches including metagenomics and metatranscriptomics. Recently, he is involved in several projects looking at the structure and evolution of human-associated microbiome in response mainly to diet and diet-associated disorders.

Soichi Furukawa

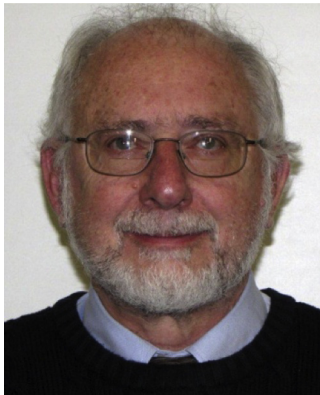


Soichi Furukawa was awarded his BS in 1996 and his PhD in 2001, both from Kyushu University, Japan. During 1998–2001 he was a Research Fellow of the Japan Society for the Promotion of Science. Since 2001 he has worked as Assistant Professor, Principal Lecturer, and is now the Associate Professor at the College of Bioresource Sciences in Nihon University, Japan. He worked as a Researcher during 2005-6 in the O'Toole laboratory at the Dartmouth Medical School, New Hampshire.

He has authored 59 papers in scientific international journals, and is involved with the following academic societies: Member of American Society for Microbiology; Administration officer of Japan Society for Lactic Acid Bacteria; Representative of Japanese Society for Bioscience and Biotechnology; Member of Japanese Society for Bioscience, Biotechnology, and Agrochemistry; Member of Japanese Society for Food Science and Technology. He also is an editorial board member of the *Japanese Journal of Lactic Acid Bacteria*.

He was awarded the Incentive award of The Japanese Society for Food Science and Technology (2007), and the Japan Bioindustry Association, Encouraging prize of Fermentation and Metabolism (2009).

Colin Gill



Colin Gill has worked on various aspects of the microbiology of raw meats, including frozen product, since 1973; until 1990 in New Zealand, and subsequently with Agriculture and Agri-Food Canada. He has published some 200 research papers or review articles in scientific journals and books.

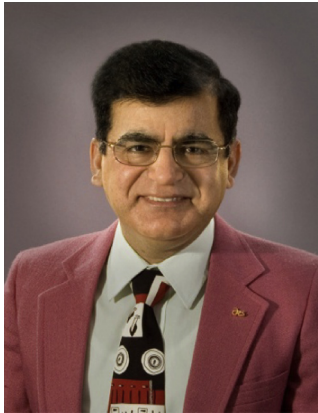
Jean-Pierre Guyot



JPG is a researcher of IRD (Institut de recherche pour le développement, France). As a microbial ecophysiological he started his career in the 1980s by exploring the world of methanogens and sulfate-reducing bacteria, first in the lab of Professor Ralf Wolfe (University of Champaign Urbana, USA). Following this first research experience, he was during a nine year stay in Mexico a visiting researcher at the UAM-Iztapalapa (Universidad Autonoma Metropolitana) and investigated the microbial ecophysiology of anaerobic digestion for the treatment of wastewaters from the agro-food and petrochemical industries.

Back to France in 1995 at the IRD's research centre of Montpellier, he started a new research on the microbial ecophysiology of traditional amylaceous fermented foods in tropical countries, mainly those consumed by young children (6-24 m.o.) as complementary food to breast feeding in African countries (e.g. Burkina Faso, Benin, Ethiopia,...), exploring the relation between the food matrix, its microbiota, and the nutritional quality of fermented complementary foods.

On the present time, JPG is the head of the IRD's research group "NUTRIPASS": "Prevention of malnutrition and associated pathologies" (<http://www.nutripass.ird.fr/>).



Dr. Vijay K. Juneja is a Lead Scientist of the 'Predictive Microbiology' research project at the Eastern Regional Research Center, ARS-USDA, Wyndmoor, PA. He received his Ph.D. degree in Food Technology and Science from the University of Tennessee, Knoxville. Vijay has developed a nationally and internationally recognized research program on foodborne pathogens, with emphasis on microbiological safety of minimally processed foods and predictive microbiology. He has authored/coauthored over 300 publications, including 135 peer-reviewed journal articles and is a co-editor of eight books on food safety. Dr. Juneja has been a recipient of several awards, including the ARS, North Atlantic Area, Senior Research Scientist of the year, 2002; '2005 Maurice Weber Laboratorian Award,' of the International Association for Food Protection; '2012 Institute of Food Technologists (IFT) Research and Development Award'; '2012 National Science Foundation Food Safety Leadership Award for Research Advances', etc. He was elected IFT Fellow in 2008.

Vijay K. Juneja



Michael G. Kontominas is a Chemistry graduate of the University of Athens (1975). He earned his Ph.D. in Food Science from Rutgers University, New Brunswick, NJ, USA in 1979. After a short post doc at Rutgers U. he joined the faculty of the Chemistry Department, University of Ioannina, Ioannina, Greece in 1980 where he was promoted to Full Professor in 1997. He served as Visiting scholar at Michigan State University, East Lansing, MI, Rutgers University and Fraunhofer Institute, Munich, Germany. He also served as Visiting Professor in the Chemistry Department of the University of Cyprus and the American University in Cairo, Egypt. He has published 166 articles in international peer-reviewed journals and more than 20 chapters in book volumes by invitation. His research interests include: Analysis of Contaminants in Foods, Non thermal methods of Food Preservation, Food Packaging, and Food Microbiology. He has co-authored two University text books on 'Food Chemistry' and 'Food Analysis' respectively and edited two book volumes, 'Food Packaging: Procedures, Management and Trends' (2012) and 'Food Analysis and Preservation: Current Research Topics' (2012). He has materialized numerous national and international (EU, NATO, etc.) research projects with a total budget over 5 M Euros. He is editor of two international journals (*Food Microbiology*, *Food and Nutritional Sciences*). He has supervised 14 Ph.D. and 45 MSc. theses already completed. He has served for several periods as Head of Section of Industrial and Food Chemistry, Department of Chemistry, University of Ioannina and as national representative of Greece to the European Food Safety Authority (EFSA) in the Working group: Safety of Irradiated Food. He received the 1st prize both at national and European level in the contest 'Ecotrophilia 2011' on the development of eco-friendly food products. During the period 2010–2012 he served on the Board of Directors of the Supreme Chemical Council of the State Chemical Laboratory of Greece. He is also technical consultant to the Greek Food and Packaging industry.

Michael G. Kontominas



He received an Engineering Degree in 1971 and a PhD in Food and Fermentation Technology from the University of Agriculture in Vienna in 1974.

He was Research Associate at the Department of Food Technology in Vienna, Austria; Visiting Scientist at the Western Regional Research Centre of the US Department of Agriculture, Berkeley, USA; at the Department of Food Science Cornell University, Ithaca, USA and of Reading University, Reading, UK. From 1978 until 1987 he was Associate Prof., Full Professor and Acting Chair at the Department of Food Science at the University of Delaware, Newark, DE, USA where he kept a position as Research Professor. From 1987 to 2012 he was Full Professor and Department Head at the Department of Food Biotechnology and Food Process Engineering, Technische Universität Berlin, including the position of Director of the Institute of Food Technology and Food Chemistry at the Technische Universität Berlin. He also holds an Adjunct Professorship at Cornell University.

Prof. Knorr is Editor of the Journal *"Innovative Food Science and Emerging Technologies"*.

He is President of the European Federation of Food Science and Technology, member of the Governing Council, International Union of Food Science and Technology, and Member of the International Academy of Food Science and Technology.

In 2013 he received the EFFoST Life Time achievement Award, 2011 he got the IAEF Life Achievement Award, in 2003 the Nicolas Appert Award, and in 2004 the Marcel Loncin Research Prize of the Institute of Food Technologists and the EFFoST Outstanding Research Award as well as the Alfred-Mehlitz Medaille, German Association of Food Technologists.

Prof. Knorr has published approximately 500 scientific papers, supervised approx. 300 Diploma/Master Thesis and approx. 75 PhD theses. He holds seven patents and is one of the ISI "highly cited researchers".

Dietrich Knorr



Aline Lonvaud

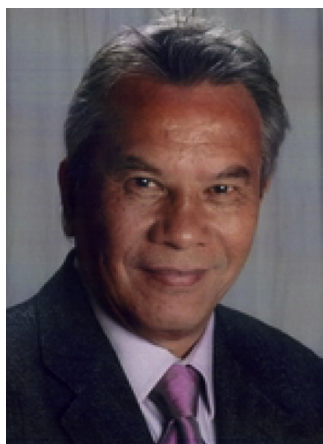
Aline Lonvaud is Professor Emeritus at the University of Bordeaux in the Sciences Institute of Vine and Wine. After obtaining her master's degree in biochemistry, she completed her first research at the Institute of Oenology of Bordeaux under the direction of Professor Ribéreau-Gayon and obtained his Doctorate in Sciences for his studies on the lactic acid bacteria in wine. She began her career in 1973 as a teacher and as a researcher for the wine microbiology at the University of Bordeaux. Her work then continued those very new on the malolactic enzyme of lactic acid bacteria. At that point she engaged her research towards other metabolic pathways lactic acid bacteria important for their impact on wine quality. The bacterial use of citric acid, glycerol, the decarboxylation of certain amino acids, the synthesis of polysaccharides have been studied from the isolation of bacteria to the identification of the key genetic determinants of these pathways. On the practical level this has led to accurate genomic tools, sensitive and specific, made available to oenology laboratories for wine control and prevention of spoilage. By the late 1980s, Professor Aline Lonvaud had addressed the topic of the *Oenococcus oeni* adaptation to growth in wine, in relation to industrial malolactic starter cultures, by the first studies on the significance of the membranes composition for these bacteria. The accumulation of results on the metabolic pathways and the first data on the adaptation of cells to their environment, obtained in the framework of several PhD theses, showed the need to implement other approaches. For this she directed the research in order to learn more about the diversity of strains of the *O. oeni* species and their relationships with the other partners in the oenological microbial system.

Among recent work Professor Aline Lonvaud led a phylogenetic study on the biodiversity of *O. oeni* which involved more than 350 strains isolated worldwide. Currently, the microbiology laboratory of the wine develops an axis on the microbial community of grapes and wine, started under the leadership of Aline Lonvaud for some fifteen years. The students of DNO (National Diploma of Oenology) and other degrees of Master of the ISVV benefit from these results, which are also valued by the activity of the spin-off "Microflora®" of which Professor Aline Lonvaud provides scientific direction. Today as Professor Emeritus, Aline Lonvaud works as an expert in the microbiology group of the OIV (International Organisation of Vine and Wine), as editor and reviewer for various scientific journals and for professional organizations in the field of microbiology of wine.



Aurelio López-Malo Vigil

Aurelio López-Malo is Professor in the Department of Chemical, Food, and Environmental Engineering at Universidad de las Américas Puebla. He has taught courses and workshops in various Latin American countries. Dr. López-Malo is co-author of Minimally Processed Fruits and Vegetables, editor of two books, authored over 30 book chapters and more than 100 scientific publications in refereed international journals, is a member of the *Journal of Food Protection* Editorial Board. Dr. López-Malo received his PhD in Chemistry in 2000 from Universidad de Buenos Aires in Argentina, the degree of Master in Science in Food Engineering in 1995 from the Universidad de las Américas Puebla, and he graduated as a Food Engineer from the same institution in 1983. He has presented over 300 papers in international conferences. He belongs to the National Research System of Mexico as a National Researcher Level III. He is Member of the Institute of Food Technologists (IFT), the International Association for Food Protection (IAFP), and the American Society for Engineering Education (ASEE). Dr. López-Malo has directed or co-directed over 35 funded (nationally and internationally) research projects and has participated in several industrial consulting projects. His research interests include Natural Antimicrobials, Predictive Microbiology, Emerging Technologies for Food Processing, Minimally Processed Fruits, and K-12 Science and Engineering Education.



Rob Samson

Since 1970 Rob Samson has been employed by the Royal Netherlands Academy of Science (Amsterdam) at the CBS-KNAW Fungal Biodiversity Centre and is group leader of the Applied and Industrial Mycology department. He is Adjunct Professor in Plant Pathology of the Faculty of Agriculture, Kasetsart University Bangkok, Thailand since July 15, 2002. Since January 2009 he has been the visiting professor at Instituto de Tecnologia Quimica e Biologica of the Universidade Nova de Lisboa in Portugal. He is also an Honorary Doctor of Agricultural Sciences of the Faculty of Natural Resources and Agricultural Sciences at the Swedish University of Agricultural Sciences in Uppsala (October 3 2009).

Rob's main specialization is in the field of Systematic Mycology of *Penicillium* and *Aspergillus* and food-borne fungi. He also specializes in the mycobiota of indoor environments, entomopathogenic, thermophilic fungi, and scanning electronmicroscopy. His current research interests include: Taxonomy of *Penicillium* and *Aspergillus*; Food-borne fungi with emphasis on heat resistant and xerophilic molds; Molds in indoor environments; and Entomogenous fungi.

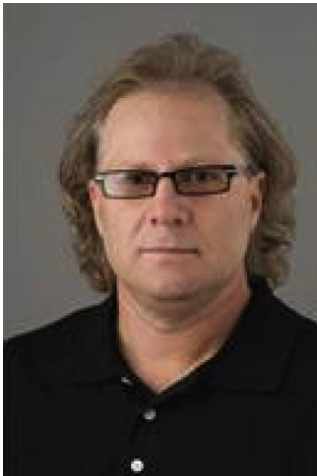
Rob is the Secretary General of the International Union of Microbiological Societies (IUMS); Member of the Executive Board of the International Union of Microbiological Societies since 1986; Chairman of the IUMS International Commission on *Penicillium* and *Aspergillus*; Vice Chairman of the International Commission on Food Mycology; Member of the International Commission of the Taxonomy of Fungi; Chairman of the IUMS International Commission on Indoor Fungi; Honorary Member of the American Mycological Society; and an Honorary Member of the Hungarian Society of Microbiology.

*Ulrich Schillinger*

Dr. Ulrich Schillinger obtained his PhD (Dr. rer. nat.) at the University of München, Germany in 1985 and completed his post doctoral research at the Bundesanstalt für Fleischforschung (Meat Research Centre) in Kulmbach. In 1989, he became head of a food microbiology lab at the Institute of Hygiene and Toxicology of the Bundesforschungsanstalt für Ernährung und Lebensmittel (Federal Research Centre for Nutrition and Food) in Karlsruhe. Since 2008, he worked at the Institute of Microbiology and Biotechnology of the Max Rubner Institut, Bundesinstitut für Ernährung und Lebensmittel in Karlsruhe.

He published about 100 research papers in peer-reviewed international scientific journals and several books in microbiology and food sciences. He served as editorial board member of '*Food Microbiology*' and as a regular reviewer of many scientific journals.

His research has focused on food microbiology, the taxonomy and physiology of lactic acid bacteria, their application as bioprotective and probiotic cultures, bacteriocins and fermented foods.

*Bart Weimer*

Dr. Weimer is professor of microbiology at University of California, Davis in the School of Veterinary Medicine since 2008. In 2010 he was appointed as faculty assistant to the Vice Chancellor of Research to focus on industry/university partnerships. Subsequently, he was also appointed as co-director of BGI@UC Davis and director of the integration core of the NIH Western Metabolomics Center in 2012. Prior to joining UC Davis Dr. Weimer was on faculty at Utah State University where he directed the Center for Integrated BioSystems for seven years. The primary thrust of his research program is the systems biology of microbial infection, host association, and environmental survival. Using integrated functional genomics Dr. Weimer's research program examines the interplay of genome evolution and metabolism needed for survival, infection, and host association. The interplay between the host, the microbe, and the interdependent responses is a key question for his group. His group is currently partnered with FDA and Agilent Technologies to sequence the genome of 100,000 pathogens and is conducting metagenome sequence of the microbiome of chronic disease conditions associated with the food supply. Most recently he was honored with the Agilent Thought Leader Award and his work in microbial genomics received the HHSInnovate award as part of the 100K genome project. During his career Dr. Weimer mentored 30 graduate students, received seven patents with six pending, published over 90 peer-reviewed papers, contributed 17 book chapters, edited three books, and presented over 400 invited scientific presentations.

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