CRACKING THE DIGITAL CEILING

Is computing just for men? Are men and women suited to different careers? This collection of global perspectives challenges these commonly held Western views, perpetuated as explanations for women’s low participation in computing. By providing an insider look at how different cultures worldwide impact the experiences of women in computing, the book introduces readers to theories and evidence that support the need to turn to environmental factors, rather than innate potential, to understand what determines women’s participation in this growing field. This wake-up call to examine the obstacles and catalysts within various cultures and environments will help those interested in improving the situation understand where they might look to make changes that could impact women’s participation in their classrooms, companies, and administrations. Computer scientists, STEM educators, students of all disciplines, professionals in the tech industry, leaders in gender equity, anthropologists, and policy makers will all benefit from reading this book.


Dr. Jeria L. Quesenberry is an associate teaching professor of information systems at Carnegie Mellon University. Her research interests include cultural influences on IT students and professionals, social inclusion, and broadening participation. She is co-author of Kicking Butt in Computer Science: Women in Computing at Carnegie Mellon University (2015).
Cracking the Digital Ceiling

Women in Computing around the World

Edited by

CAROL FRIEZE
Carnegie Mellon University

JERIA L. QUESENBERRY
Carnegie Mellon University
Contents

List of Contributors          page ix
Acknowledgments              xii
Introduction                 1

PART I GLOBAL PERSPECTIVES    23
1  An Inegalitarian Paradox: On the Uneven Gendering of Computing Work around the World
   Tiffany Chow and Maria Charles  25

2  A Global Perspective on Women in Information Technology: Perspectives from the "UNESCO Science Report 2015: Towards 2030"
   Sophia Huyer                     46

3  Field Studies of Women in Europe, North America, Africa, and Asia-Pacific: A Theoretical Explanation for the Gender Imbalance in Information Technology
   Eileen M. Trauth                 61

PART II REGIONAL PERSPECTIVES 73
4  Sociocultural Complexities of Latin American and Caribbean Women in Computing
   Palma Buttles and Fred Valdez, Jr. 75

5  A Gender Perspective on Computer Science Education in Israel: From High School, through the Military and Academia to the Tech Industry
   Orit Hazzan, Efrat Nativ-Ronen, and Tatiana Umansky 90
vi Contents

6 Factors Influencing Women’s Ability to Enter the Information Technology Workforce: Case Studies of Five Sub-Saharan African Countries 104
Sophia Huyer and Nancy J. Hafkin

PART III CULTURAL PERSPECTIVES FROM THE UNITED STATES AND EUROPE 119
7 Against All Odds: Culture and Context in the Female Information Technology Professional’s Career Choice and Experiences 121
Monica P. Adya
8 Cultures and Context in Tech: A Dynamic System 142
Sally A. Applin
9 Perspectives of Women with Disabilities in Computing 159
Brianna Blaser, Cynthia Bennett, Richard E. Ladner, Sheryl E. Burgstahler, and Jennifer Mankoff
10 An Interview with Dr. Sue Black, OBE, Computer Scientist and Computing Evangelist 183
Carol Frieze and Jeria L. Quesenberry
11 An Overview of the Swedish Educational System with a Focus on Women in Computer Science: Looking Back to Learn for the Future 203
Sinna Lindquist and Ingrid Melinder
12 Portugal: Perspectives on Women in Computing 229
Arminda Guerra Lopes
13 Women in Computing: The Situation in Russia 246
Evgeniy K. Khenner

PART IV CULTURAL PERSPECTIVES FROM ASIA-PACIFIC 261
14 More Chinese Women Are Needed to Hold Up Half the Computing Sky 263
Ming Zhang and Yichun Yin
15 How the Perception of Young Malaysians toward Science and Mathematics Influences Their Decision to Study Computer Science 276
Mazliza Othman and Rodziah Latih
Contents

16 Women as Software Engineers in Indian Tamil Cinema
   Joyojeet Pal 290

17 Women in Computing Education: A Western or a
   Global Problem? Lessons from India
   Roli Varma 299

18 Challenging Attitudes and Disrupting Stereotypes of
   Gender and Computing in Australia: Are We Doing It Right?
   Catherine Lang 311

Conclusion 324

Notes 337

Index 343
Contributors

Monica P. Adya
Department of Management, Marquette University

Sally A. Applin
School of Anthropology and Conservation, University of Kent

Cynthia Bennett
Human Centered Design & Engineering, University of Washington

Sue Black
Department of Computer Science, Durham University

Brianna Blaser
DO-IT, University of Washington

Sheryl E. Burgstahler
DO-IT, University of Washington

Palma Buttles
Software Engineering Institute, Carnegie Mellon University

Maria Charles
Broom Center for Demography, University of California – Santa Barbara

Tiffany Chow
Department of Sociology, University of California – Santa Barbara

Carol Frieze
School of Computer Science, Carnegie Mellon University

Nancy J. Hafkin
Women in Global Science and Technology

ix
List of Contributors

Orit Hazzan
Education in Science and Technology, Technion

Sophia Huyer
CGIAR Climate Change, Agriculture and Food Security Programme

Evgeniy (Eugene) K. Khenner
Department of Information Technologies, Perm State University, Russia

Richard E. Ladner
Department of CS & Engineering, University of Washington

Catherine Lang
Department of Education, La Trobe University

Rodziah Latih
Department of IS & Technology, University Kebangsaan Malaysia

Sinna Lindquist
FOI – Swedish Defence Research Agency

Arminda Guerra Lopes
Department of Informatics, Polytechnic Institute of Castelo Branco

Jennifer Mankoff
Department of CS & Engineering, University of Washington

Ingrid Melinder
Department of CS and Communication, KTH Royal Institute of Technology

Efrat Nativ-Ronen
Registration and Admissions Department, Technion

Mazliza Othman
Department of CS & Information Technology, University of Malaya

Joyojeet Pal
Microsoft Research India

Jeria Quesenberry
Information Systems Program, Carnegie Mellon University

Eileen M. Trauth
College of Information Sciences & Technology, Pennsylvania State University

Tatiana Umansky
The Statistics Laboratory, Technion
List of Contributors

Fred Valdez, Jr.
Department of Anthropology, University of Texas at Austin

Roli Varma
School of Public Administration, University of New Mexico

Yichun Yin
Noah’s Ark Lab, Huawei Technologies

Ming Zhang
Department of Electronics Engineering and CS, Peking University
Acknowledgments

The editors wish to express our gratitude and appreciation to those who helped make this book possible. We especially wish to thank our authors for their encouragement, insights and excellent contributions to the book. This group of authors are leaders in advancing the visibility of the barriers to and catalysts for success that women in computing encounter around the world. We acknowledge the great work of the many educational, governmental and organizational institutions throughout the world who empower women in computing. Many leaders in the effort are identified throughout the chapters in this book. We thank Carnegie Mellon University for their institutional support and the value they place on inclusion and diversity. In particular, we want to acknowledge the work of Carnegie Mellon CS professor and Founder of Women@SCS, Lenore Blum, who initiated and led the way for cultural change in Carnegie Mellon’s School of Computer Science.

We also thank Kaitlin Leach and her team at Cambridge University Press for their interest and support of this project. Their contributions throughout the whole process from inception of the initial idea to final publication have been invaluable. We also appreciate the attention to detail that Stephanie Sakson put into the copyediting efforts. Thank you to our external reviewers who provided constructive and comprehensive feedback.

We dedicate this book to Carol’s granddaughters Maisie, Molly, Gracie, and Sophie, and Jeria’s daughter Ella. We hope this book will inspire their lives in the ways other women have inspired ours.