

A network diagram featuring numerous circular portraits of diverse individuals, connected by a web of thin, grey lines. The portraits are distributed across the entire cover, with a higher density in the central and lower portions. The lines represent connections between the individuals, symbolizing a global or digital network.

DIGITAL HUMANITARIANS

How BIG DATA Is Changing the Face of Humanitarian Response

PATRICK MEIER



CRC Press
Taylor & Francis Group

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Patrick Meier is a passionate evangelist for the power of big data to help us respond to natural disasters and other crises. He is also a careful scholar who thinks deeply about the limits and potential dangers of data-centric approaches. His book offers both inspiration for those around the world who want to improve our disaster response and a set of fertile challenges to ensure we use data wisely and ethically.

—**Ethan Zuckerman**, Director, MIT Center for Civic Media and author of *Rewire: Digital Cosmopolitans in the Age of Connection*

I dare you to read this book and not have both your heart and mind opened. Patrick Meier writes compellingly about his first-hand accounts of people around the world working together to help disaster victims through advanced computing solutions.

—**Leysia Palen**, Associate Professor and Director of Project EPIC—Empowering the Public with Information during Crises, University of Colorado, Boulder

Something very like the fog of war afflicts crisis response. On the ground, simply knowing what is wrong—who is suffering? where is the danger?—is both critical and difficult. In *Digital Humanitarians*, Patrick Meier, a scholar and practitioner of crisis response, shows us how simple digital tools, built and staffed by a worldwide network of volunteers, are providing faster and more comprehensive data for disaster response efforts. Working from examples like the Haitian earthquake and the Arab Spring, Meier shows how tools from artificial intelligence to aerial drones, and techniques from crowdmapping to distributed fact-checking, are helping to dispel some of that fog.

—**Clay Shirky**, Associate Professor, Arthur L. Carter Journalism Institute, New York University, and author of *Here Comes Everybody: The Power of Organizing Without Organizations*

An insider's guide to the humanitarian data revolution, seen through the eyes of a thought leader, scholar, and expert practitioner on the front lines of a global movement that is already transforming how we understand and respond to crises.

—**Robert Kirkpatrick**, Director of United Nations Global Pulse

Business, economics, and governance are transforming as traditional state-based institutions are supplemented and indeed eclipsed by non-state networks of civil society. New technologies are enabling regular citizens to connect, collaborate, and save lives. In his book, Meier shows these same trends emerging in the field of humanitarian response. Global problem solving is rapidly evolving and Meier will help get you on board.

—**Don Tapscott**, Global Solutions Network and co-author of *Wikinomics*

This book breaks new ground as Patrick Meier charts the optimism, the possibilities, and the dilemmas of a new Digital Humanitarianism from his own first-hand experience. For anyone in the Humanitarian sector—ignore this book at your peril.

—**Tarun Sarwal**, Innovation Advisor, International Committee of the Red Cross (ICRC)

Meier offers an illuminating look at how digital humanitarian have been creating value from big data for nearly a half-decade. He changes the narrative surrounding the “traditional” humanitarian community—often thought to be intransigent and inflexible—by presenting examples of how humanitarian organizations are actively exploring how to incorporate big data and crowdsourcing into their decision-making processes. His authoritative volume crackles with honest insights about the current and future state of humanitarian response.

—**Albert Gembara**, Technology Integration Officer, United States Agency for International Development (USAID)

Patrick Meier has been the leading figure in creating a new type of disaster responders, digital humanitarians, and in this groundbreaking book he takes us through the story of how technology can truly revolutionize how we deal with some of the most chaotic events we experience.

—**Gisli Olafsson**, Emergency Response Director, NetHope, and author of *The Crisis Leader*

For all the technology firsts, this is first a story about volunteers. It is also a story about the relentless application of fundamental information technology skills, collecting, processing, and making understandable an avalanche of data. Not only is this about the heart of information technology professionals, it is about the application of information technology skills; and in a crisis, any professionals want to contribute what they know best.

—**Ed Happ**, Global Chief Information Office (CIO) of the International Federation of the Red Cross and Red Crescent Societies (IFRC)

This book is deeply relevant and astonishingly up to date. No surprise—Patrick Meier has been the heartbeat of digital humanitarianism long before the phrase was coined and only he could have written this account. In the early days (7–8 years ago), there were mappers and humanitarians. Patrick began writing his blog; more people from both camps began to talk to each other. And then the Haiti earthquake struck in January 2010. From that instant the story takes off. Beginning with what can be accomplished by the dedication and talent of circles of friends and alert strangers—mapping the streets of Port au Prince and finding trapped victims based on their tweets—this book traces the explosion in crisis response analytics that has created the universe of digital humanitarianism. Eminently readable and packed with details and insights, this book presents and explains a phenomenon that is still in its early stages. It deals with the potential of Big Data, issues of security and reliability, the role of artificial intelligence, and invites the reader to participate in an enterprise that is already changing the ways that governments, agencies, groups, and individuals understand and respond to crises of disaster and forced migration from war. Every consumer of world news and everyone living in a potential disaster zone must read this book to see how globalized digital sets of networks—and the volunteers behind them—are transforming our capacities to help locate, talk to, rescue, and sustain people trapped in the major calamities of our time.

—**Jennifer Leaning**, Professor at Harvard University’s School of Public Health and Director of Harvard University’s FXB Center for Health and Human Rights

Patrick Meier's new book is extraordinarily timely, providing practitioners and policy makers with an accessible guide to how digital technology can help to improve humanitarian outcomes.

—**Joanna Macrae**, Head of Humanitarian Innovation Programme,
Department for International Development (DFID)

If you want to be enlightened about how technology is revolutionizing humanitarian aid, then this book is for you. In *Digital Humanitarians* Patrick Meier depicts a humanitarian endeavor that is being enriched by the efforts of a growing global network of smart, savvy innovators. Expertly fusing front-line experience, technological expertise, and a deeply humane worldview, Meier closes with a rousing call for change: toward a more open, democratic humanitarian system. All of us working in international disaster response should be paying close attention.

—**Ben Ramalingam**, Chair of the Humanitarian Innovation Fund (HIF)
and author of *Aid on the Edge of Chaos*

This book shows us once again why Patrick Meier is a thought leader in leveraging emerging technologies for social impact. His book captures the enormous possibilities and avoidable pitfalls of big data, social media, and artificial intelligence in crisis contexts. Digital humanitarians can be powerful agents for social change but ground-truthing what we see and hear digitally is more important than ever.

—**Aleem Walji**, Chief Innovation Advisor, Leadership, Learning,
and Innovation, World Bank Group

Patrick Meier is a master cartographer. He is a talented crisis mapper, sure, but he's mapping something even bigger in this book. He's mapping the ecosystem of digital humanitarianism—the hills of human motivations, the seas of human institutions, and the urban landscape of human technology. The ideas and stories here not only plot the path for digital humanitarians in disasters, but they illuminate a runway of opportunity for all of philanthropy and social innovation in the digital age.

—**Wendy Harman**, Director of Information Management and Situational
Awareness, American Red Cross

There has been a lot of hype about the role technology can play in the humanitarian space, with very little to show for it. Patrick Meier—in his book and in his work—is one of the few people who has gone beyond talk to show how big ideas can translate into very concrete initiatives that help save lives. He also shows a fascinating glimpse into the early days of crisis mapping and the passionate group of volunteers who are transforming the way we work. This book is indispensable reading for anyone who is interested in finding ways to incorporate technology into their work as humanitarians.

—**Sharon Morris**, Senior Advisor to the President, US Institute of Peace (USIP)

Patrick provides a fascinating read for anyone interested in how technology could spur the humanitarian community far into the 21st century. Building from his very personal

experience that propelled him into the digital humanitarian space, Patrick lays out the amazing achievements of many who have dreamed to change the world for the better. At the same time, and perhaps more importantly, Patrick also outlines what the humanitarian community can do to fully embrace new technologies and approaches—many of which are already revolutionizing other industries.

—**Andrej Verity**, Cofounder of Digital Humanitarian Network

Patrick Meier is not your stereotypical explorer, but in many respects he is the quintessential explorer. He is determined to scale and tame the peaks of Big Data that are rising unrelentingly around us in the form of social media, satellite imagery and other information. Constantly researching and analyzing successful problem-solving applications and models in cross-disciplinary fields like digital archaeology and conservation technology, Patrick is exploring new frontiers, applying innovative tools and methodologies to test and refine solutions to big humanitarian problems. Any digital explorer interested in better understanding the combined power of collective and artificial intelligence should read *Digital Humanitarians*.

—**Alex Moen**, Vice President, Strategic Initiative and Explorers Program,
National Geographic

Patrick Meier's brilliant and inspiring book documents the power that everyday citizens have when responding to humanitarian crises or political repression. Patrick writes from the unique perspective of having played a key role in the development and evolution of the digital humanitarian field. The book provides a wonderful combination of case studies exploring many successes and challenges and also has a critical and necessary exploration of the many ethical issues around the use of technology in humanitarian work, such as privacy, safety, power, and agency. This book is a must read for students, faculty, policymakers, activists, simply anyone who is engaged or seeking to engage in technology for social change.

—**Craig Zelizer**, Professor at Georgetown University and Associate Director
of Conflict Resolution Program

In this definitive and often gripping account, Patrick Meier traces the rise of a new generation of global humanitarians who are using social media, satellite, and aerial drone imagery, microtasking, big data, and other digital tools to respond to natural disasters and political humanitarian crises. A leader himself in the efforts to develop and network digital tools for social good, Meier shows how technology, idealism, and global social networking are rapidly coevolving to empower local actors and enhance the world's ability to respond to complex emergencies. This is a fascinating, important, and deeply hopeful book about the way digital tools are facilitating and transforming global cooperation.

—**Larry Diamond**, Director, Center on Democracy, Development, and the
Rule of Law (CDDRL), Stanford University

Intelligent, well-written, and inspiring, *Digital Humanitarians* offers an agenda for how the world can use technology to transform the lives of people in crisis. It combines a rare

understanding of the state-of-the-art in innovation and technology with sensitivity to the most pressing global challenges. It should be read by anyone who cares about our common future.

—**Alexander Betts**, Associate Professor and Director of the Humanitarian Innovation Project, University of Oxford

Patrick Meier is the inspiring thought leader behind digital humanitarians, a grassroots revolution with a reach and impact that in only a few years has transformed global humanitarian response. The activation and contribution of digital humanitarians are today an essential part of humanitarian response operations in disaster-affected areas all over the world. Patrick's book provides for an absolutely essential, practical, and inspiring account of the origins and future of this new humanitarian realm, where human ingenuity, new technologies, and computational power create unprecedented opportunities for saving human lives. I consider this book as authoritative core reading for academics, practitioners, and policy makers for years to come.

—**Bartel Van de Walle**, Cofounder, Information Systems for Crisis Response and Management (ISCRAM) and Associate Professor, Department of Information Management, Tilburg University

In clear, compelling prose, Patrick Meier offers readers of *Digital Humanitarians* a front row seat into the start of the digital revolution that has swept the world since he and his colleagues created—from scratch and on the fly—a digitally based response to the 2010 earthquake that devastated Haiti. He explains the strengths and potential weaknesses of using big data and crowdsourced analytics in crisis situations. It is at once a deeply personal and intellectually satisfying book.

—**Steven Livingston**, Professor of Media and Public and International Affairs at the Elliott School of International Affairs at George Washington University (GWU)

Technological and methodological developments are rapidly changing the face of humanitarian action. We are encountering a flurry of new tools involving cell phones and Internet-based platforms for data aggregation, analysis, and visualization. We are exploiting the potential of collective and artificial intelligence. We are collecting data from satellites and drones while we are also involving thousands of people in reporting events, locations of assets, and places of danger. In *Digital Humanitarians*, Patrick Meier provides an interesting and useful overview of these developments, and offers examples drawn from years of hard-earned experience. This is essential reading for both students and practitioners of humanitarian action. Those who read it will be able to navigate this important, exciting, and dynamic field.

—**Joseph G. Bock**, Teaching Professor, Eck Institute for Global Health, University of Notre Dame, and author of *The Technology of Nonviolence: Social Media and Violence Prevention*

Patrick Meier is a humanitarian in the trenches—working tirelessly to use technology for the greater good. In his new book, he highlights the latest solutions revolutionizing humanitarian response, ranging from social media platforms powered by artificial intelligence to crowd computing solutions that analyze satellite and UAV imagery. Throughout the book, however, Patrick returns to the fundamental story behind these technologies—the human story, the digital humanitarian volunteers who mobilize across time zones to help others in need. As Patrick says, “This is the kind of world I want to live in.”

—**Claire Diaz-Ortiz**, Director of Social Innovation, Twitter

Meier’s book is essential reading on at least two counts. First, it captures key developments on and around the use of web, Internet and mobile communications during and after disasters, cutting through the hype and grappling with critical questions related to technology and governance. Second, it is a timely publication. The preparation, response to and recovery from disasters today is inextricably entwined with technology, at local, regional and international levels. Meier looks at how what is already taken for granted came about, and looks critically at what it means for humanitarianism in the future.

—**Daniel Stauffacher**, Former Swiss Ambassador to the United Nations and Founder of the ICT for Peace Foundation (ICT4Peace); Sanjana Hattotuwa, Special Advisor at ICT4Peace & TED Fellow

Finally, someone who knows both the potential of mobile, networked technologies and the practicalities of how to use these tools to enhance humanitarian work. Meier’s new book, *Digital Humanitarians*, has the potential to relieve suffering by showing activists, citizens, and technologists how to use everything from satellite imagery to big data techniques and social media to save lives in natural disasters and other crises that require humanitarian response. This book can save lives!

—**Howard Rheingold**, Lecturer at Stanford University and author of bestsellers *Smart Mobs*, *Net Smart* and *Virtual Reality*

The ideas and lessons in this book could save millions of lives in the 21st century. Digital tools—from crowdsourced mobile data to satellite imagery—promise to make the world more transparent, more inclusive, and more locally empowered. Patrick Meier charts a bold new course for humanitarianism that harnesses technology’s revolutionary potential, while also addressing the need for safeguards. His brilliant combination of scholarship, real-world experience, and thoughtful perspective makes this essential reading for anyone who wants to understand the future of humanitarian action.

—**Andrew Zolli**, Futurist and author of *Resilience: Why Things Bounce Back*

Since it became possible for nearly anyone with a cell phone or an Internet connection to send data, photos, and other information around the world with a few key strokes, we’ve seen a number of books attempt to catalog this incredible revolution. What makes this book different—and exceptionally important to humanitarians and peacebuilders alike—is that it has been written from the perspective of one who has helped to lead the

revolution. If you want to understand both the power and the pitfalls of digital humanitarianism—a movement unprecedented in human history—read Patrick’s take on it. You’ll be richer for it.

—**Sheldon Himelfarb**, Director of PeaceTech Lab,
United States Institute for Peace (USIP)

Patrick Meier has been at the center of the digital humanitarian movement for all of its recent history. This thoughtful collection of case studies and analyses provides a first-hand account of how the tools, practices and community of digital humanitarians have succeeded, stumbled, and evolved. There’s a welcome mix of accessible technical content and, more importantly, stories about the people who’ve taken technology and shaped it into tools that help others when they’re most in need.

—**Tariq Khokhar**, Data Scientist and Open Data Evangelist, World Bank

Digital Humanitarians is a MUST-READ for anyone who believes that new technologies and big data, when used properly, can save millions of peoples lives during disasters and times of crisis. Meier is not only a master storyteller of real world events, he is a practitioner and visionary who is showing governments and NGOs, and all of us how to think and do disaster relief in the 21st century.

—**Andrew Rasiej**, Founder of Personal Democracy Media
and Senior Technology Advisor at Sunlight Foundation

If you’re looking for a window into the rapidly expanding world of online volunteers, this book is for you. In this timely tome, Meier, who played a seminal role in redefining how we think about “digital humanitarianism” after the devastating earthquake in Haiti in 2010, deftly explores the significant opportunities for public good and serious risks to privacy, security, and misallocated resources, at the worst of times. From data analysis to data quality, he digs in to what’s possible with distributed intelligence and what’s still needed, including machine learning and frameworks for verification. In a world that brims over with potential to help one another through our newly networked devices, Meier’s book provides a map for how to do it better.

—**Alexander Howard**, Writer and Founder of “E Pluribus Unum”

Foreword

Digital Humanitarians examines how new uses of technology and vast quantities of digital data are transforming the way societies prepare for, respond to, cope with, and ultimately understand humanitarian disasters.

There was a time when humanitarian response was the purview of an elite, hardened set of type A personalities devoted to saving the lives of those coping with the perils of major conflicts and disasters. These humanitarians were a class not dissimilar to the brave pioneers traveling west in search of adventure, forging new paths in the midst of contexts where there were few rules, many dangers, and where the rewards were great. For humanitarians, the reward of course was not gold or land, but the chance to make a difference in the lives of countless of their fellow human beings beset by disaster. Yet, the tangible measures of their success were difficult to grasp. Stories of how many days these brave individuals went without sleep, showers, adequate food, and how they coped with a variety of different dangers created a picture of the context, but afforded little information about the effectiveness of the international humanitarian system, let alone the efforts of local communities in dealing with disaster.

There was something strangely and romantically exciting about this period, though the reality was that there was very little concrete empirical evidence to demonstrate the effectiveness of aid: it was often slow in coming, and there was a dearth of information about what affected people's needs were and how well-matched the international system's response was to these needs. There was no sense of coordination between local disaster-affected communities and international agencies, let alone amongst humanitarian agencies themselves.

Two major things happened in the mid 2000s that would dramatically change how we (the citizens of the world) would come to understand and cope with disasters. The first was a series of reforms that took place within the international humanitarian system (the Humanitarian Reform Process), and the second was the proliferation of mobile communications technologies, the rise of social, digital media, and access to vast quantities of all kinds of data (digital text, SMS, tweets, satellite, and UAV imagery), all in the hands of anyone with the inclination, drive, and motivation to do something constructive with it.

The latter phenomenon is the subject of this captivating new book written in highly accessible prose. It sheds light on the groundswell of citizen-led direct participation in disaster relief. Gone are the days where a dearth of information meant that only a very few had direct knowledge of what happened during disasters and with the ensuing response. Whereas previous generations of concerned citizens were passive recipients of news delivered by newspapers and television reports, today's citizens are active participants in disaster relief and response, creating millions of pieces of information, novel information, in texts, tweets, and images made available in real time.

The result is that the humanitarian field has been forever changed by the advent of Big Data and the attendant challenges of dealing with it accurately and quickly.

Patrick Meier weaves together a story of human dedication, innovation, and stick-to-itiveness that starts that fateful day in January of 2010 when a massive earthquake devastated Haiti, killing hundreds of thousands of people and leaving many thousands more injured and in need of massive amounts of humanitarian assistance. This response was different, though, in that it not only included local communities, the national government of Haiti, and thousands of international humanitarians and agencies that make up the international humanitarian system, but the efforts of large numbers of digital volunteers who worked together to respond to massive numbers of tweets and text messages to identify the locations of people trapped in the rubble, but still alive and texting for help. This is novel and this is just the beginning of the story.

Patrick narrates a human tale that is intermixed with rapid advances in technology, computing power, proliferation of mobile smartphones, the rapid expansion in the use of social media (especially Twitter, Facebook, and YouTube), and the advent of a mass amount of accessible commercial and private imagery made available through both satellites and unmanned aerial vehicles (UAVs or drones). These disparate technologies and sources of information are brought together in a nearly disjointed and manual manner to start (in Haiti handling tens of thousands of SMS messages—from a dorm room!), and with each experience in responding to natural disasters and conflict, the landscape changes. By the time we reach the finale, four short years later, we are in a completely different world where a dedicated, global network of volunteers, whom Patrick calls “digital humanitarians” (a network of loosely affiliated people bound by a humanitarian calling and access to the Internet and Twitter), stand on

call, ready to work hand-in-hand with machines that are programmed to learn from humans how to handle, code, and interpret tens of millions of short messages being sent through Twitter and other sources.

Digital Humanitarians tells the compelling story of how mobile technologies, computer applications, and vast quantities of digital data work in concert with a dedicated global network of new humanitarians ready to shed light on disaster-affected areas in hours, not days or weeks. Just how quickly the technology, applications, and processes are developing is astounding. One gets the sense of being hurled from the Middle Ages to the Enlightenment at exponentially increasing velocity.

This is a world where dedicated people work closely with and in increasingly elegant and synchronous ways with the technologies and applications they have created to better the lives of those most affected by disasters. But this is a rapidly changing world, one where in the moment you get your bearings, the context has completely changed. Nor is Patrick naïve to the dangers presented by these technologies in the hands of those with less meritorious intentions than the digital humanitarians he writes about. Though this community is writing the rules for the safe and appropriate uses of these technologies as they go, Patrick is cognizant of the need to codify ethical standards in doctrine, and to ensure that the use of technology and Big Data for disaster response is even safer than older analog technologies were just a few short years ago. What he's not willing to do is sit back and wait for the world to catch up. He'll be where he's most comfortable, among a network of like-minded and kind-hearted people who are two steps ahead of the rest.

Dr. Enzo Bollettino

Executive Director of the Harvard Humanitarian Initiative (HHI)

Harvard University

Preface

This is the story of thousands of largely anonymous volunteers who stepped forward in times of need. They worked long, sleepless hours for free and without expectation of praise (or blame). They did this because they saw a need. My role in this, given the accidents of interest and experience, has often been as a catalyst. While the stories that follow are told from my own voice and perspective, this should not be interpreted as taking away from the hundreds and thousands of other volunteers who each have their own stories to tell. On the contrary, I seek to amplify some of our shared stories based on how I personally experienced them. Like others, I simply found myself in the midst of these digital humanitarian efforts due to happenstance and the convergence of my professional interests and personal needs. One of these needs was to do something—*anything*—to fill those dreadful hours not knowing whether the woman I loved had survived the earthquake in Haiti. I did not catalyze the digital response to the earthquake with a grand strategy in mind. I reacted because I was anxious and desperate. From that point on digital humanitarian efforts took on a life of their own.

Acknowledgments

The stories that follow would not exist were it not for the hundreds and thousands of digital volunteers who continue to support relief efforts worldwide. So my deep gratitude goes to them first and foremost. In writing these stories, I have also benefited from invaluable feedback, both in terms of style and content. My parents, brother, and wife read every word of every page, providing me with the kind of insightful, personal guidance that only a caring family can offer. My professional and academic colleagues reviewed my final drafts with a remarkable level of detail. I am thus particularly grateful to Carlos Castillo, Sanjana Hattotuwa, Muhammad Imran, Steven Livingston, Andrej Verity, and Sarah Vieweg. I also thank my publisher Lara Zoble, who immediately understood what I wanted to do with these stories, and I am equally grateful to Andrea Verity for her design of the perfect cover for this book, which includes profile pictures of some of the remarkable digital humanitarians who I've had the honor of learning from over the years. Last, but certainly not least, I had the luxury of writing the bulk of this book during my residency fellowship at the Rockefeller Foundation's center in beautiful Bellagio, Italy. So I want to sincerely thank Rob Garris and the entire Bellagio team for providing what was truly the perfect environment for fruitful reflections and writing.

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