

SCIENCE, TECHNOLOGY, AND SOCIETY

This book gathers inter-disciplinary and multi-disciplinary perspectives on the effects of today's advances in science and technology on issues ranging from government policy-making to how we see the differences between men and women. The chapters investigate how invention and innovation really take place, how science differs from competing forms of knowledge, and how science and technology could contribute more to the greater good of humanity. For instance, should there be legal restrictions on "immoral inventions?" A key theme that runs throughout the book concerns who is taken into account at each stage and who is affected. The amount of influence users have on technology development and how non-users are factored in are evaluated as the impact of scientific and technological progression on society is investigated, including politics, economy, family life, and ethics.

TODD L. PITTINSKY is a professor in the Department of Technology and Society at Stony Brook University (SUNY), USA, and the Faculty Director of its Undergraduate College of Leadership and Service.





SCIENCE, TECHNOLOGY, AND SOCIETY

New Perspectives and Directions

EDITED BY
TODD L. PITTINSKY

Stony Brook University, State University of New York





CAMBRIDGEUNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom One Liberty Plaza, 20th Floor, New York, NY 10006, USA 477 Williamstown Road, Port Melbourne, VIC 3207, Australia 314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre,

New Delhi – 110025, India

79 Anson Road, #06-04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning, and research at the highest international levels of excellence.

www.cambridge.org Information on this title: www.cambridge.org/9781107165120 DOI: 10.1017/9781316691489

© Cambridge University Press 2019

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2019

Printed and bound in Great Britain by Clays Ltd, Elcograf S.p.A.

A catalogue record for this publication is available from the British Library.

Library of Congress Cataloging-in-Publication Data NAMES: Pittinsky, Todd L.

TITLE: Science, technology, and society: new perspectives and directions / edited by Todd L. Pittinsky, Stony Brook University, State University of New York.

DESCRIPTION: New York: Cambridge University Press, [2019]

IDENTIFIERS: LCCN 2019012493 | ISBN 9781107165120 (hardback) | ISBN 9781316616895 (paperback)

SUBJECTS: LCSH: Science – Social aspects. Technology – Social aspects. Genetic engineering – Social aspects.

CLASSIFICATION: LCC Q175.5 .s37385 2019 | DDC 303.48/3–dc23 LC record available at https://lccn.loc.gov/2019012493

18BN 978-1-107-16512-0 Hardback 18BN 978-1-316-61689-5 Paperback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.



For my father, Bernard Pittinsky, who passed on quite a bit of wisdom, but this in particular: whenever I wanted to buy some new gadget, he would ask what I needed to do that I couldn't already do.





Contents

List	t of Figures	<i>page</i> ix
	t of Tables	Х
List	t of Contributors	xi
	enowledgments	xii
	logue	xiii
Ι	Technically Based Programs in Science, Technology, and Public Policy M. Granger Morgan and Douglas Sicker	I
2	Comparative Studies of Science and Technology David Horn	28
3	On the Origins of Models of Innovation: Process and System Approaches Benoît Godin	60
4	The Third Wave of Science Studies Harry Collins and Robert Evans	79
5	Legal Regulation of Technology: Supporting Innovation, Managing Risk, and Respecting Values Roger Brownsword	109
6	The Social Shaping of Technology (SST) Robin Williams	138
7	Placing Users and Nonusers at the Heart of Technology Nelly Oudshoorn	163
8	Scientific Community Dean Keith Simonton	176

vii



viii	Contents	
9	Genetic Engineering and Society Jessica Cavin Barnes, Elizabeth A. Pitts, S. Kathleen Barnhill-Dilling, and Jason A. Delborne	203
Ю	Technology Enables and Reduces Sex Differences in Society Jens Mazei	234
II	Technology for Society Todd L. Pittinsky	253
Ina	lex	263



Figures

I.I	Schematic of the unstable equilibrium faced by	page 4
	academic programs in technology and policy.	
3.I	Frequency of use of the term technological innovation.	61
3.2	Organisation for Economic Co-operation and	71
	Development factors influencing innovations.	
4.I	Uncertified experts and the core: Relationship	85
	between technical and political dimensions in 3Wave.	
4.2	The Periodic Table of Expertises.	89
4.3	Schematic summary of the Imitation Game.	93
4.4	Three dimensions of expertise.	95
4.5	Sandwich model of science and society.	97
6.I	Analytical traditions contributing to the social shaping	147
	of technology perspective.	
8. ₁	The scientific disciplines of physics, chemistry, biology,	185
	psychology, and sociology placed in the Comtean hierarchy	
	of the sciences	



Tables

I.I	Examples of problems	page 2
1.2	Examples of topics addressed by a number of recent	II
	undergraduate technology-policy group project courses in	
	the Department of Engineering and Public Policy at	
	Carnegie Mellon University	
1.3	Web addresses of a number of the academic programs in	16
	technology and policy	
4.I	Definition of technical and political phases in 3Wave	86
II.I	Ways technology affects quality of humans' lives	255



Contributors

JESSICA CAVIN BARNES, North Carolina State University S. KATHLEEN BARNHILL-DILLING, North Carolina State University ROGER BROWNSWORD, King's College London HARRY COLLINS, Cardiff University JASON A. DELBORNE, North Carolina State University ROBERT EVANS, Cardiff University BENOÎT GODIN, National Institute of Scientific Research DAVID HORN, The Ohio State University JENS MAZEI, TU Dortmund University M. GRANGER MORGAN, Carnegie Mellon University NELLY OUDSHOORN, University of Twente TODD L. PITTINSKY, Stony Brook University ELIZABETH A. PITTS, North Carolina State University DOUGLAS SICKER, Carnegie Mellon University DEAN KEITH SIMONTON, University of California, Davis ROBIN WILLIAMS, University of Edinburgh



Acknowledgments

First, thanks to David Repetto, my editor at Cambridge University Press. David saw the potential of this project and stuck by it, even as it evolved into new versions.

I thank Emily Watton, the editorial assistant at Cambridge University Press, for skillfully and diligently working with me to go from word processing documents to the actual book.

John Elder was gracious and masterful, critical and constructive, in helping all of us to sharpen, polish, refine, and enhance our essays to their best versions.

I am grateful for Firman Manda Firmansyah's time and graphics skills in helping with the figures and tables.

Shawn Gaffney provided initial research assistance to identify contributors; the final eclectic, wonderfully diverse, and inclusive collection of authors reflects his insights.

At home, Alexandru and Vladi gave me great encouragement, in this as in all projects, perhaps most profoundly by encouraging me to stay curious about the world – as it is and as it might be.

And of course, I thank the authors who joined me in this exercise, connected initially by nothing more than the pixels making up the email inviting them to contribute. What came together is a diverse array of interests and research programs that together allow us to map – at least, for the moment – our emerging and ever-changing world.



Prologue

The dramatic advance of science and technology evokes a range of responses. Some see technology diminishing and undermining our society and even our humanity. Others see unbridled potential. What they agree on is that science and technology are profoundly changing our society. Less noted, though, is how profoundly society shapes – or could shape – the course of science and technology.

This collection offers a broad, deep, and accessible set of essays on the interplay between science, technology, and society. It reflects a very broad range of disciplines and an international group of contributors.

Science and technology studies (STS), from its birth in the 1960s, has attracted interest from a wide array of disciplines and subfields. Today, as the pace and power of science and technology become ever more apparent – with consequences literally at our fingertips – interest is exploding.

This increasing interest in the interplay and intersections of science, technology, and society is paralleled by an ever-growing desire – indeed, an imperative – for STS scholarship to make a difference. College educators are trying to devise new core curriculums that will adequately equip students to live comfortably in a world dominated by technology and science. The stakes in our real lives are too high for inquiry and examination to remain in the ivory tower.

Whether you are a professional researcher, eager to understand more about the contours and frontiers of STS, or a general reader drawn to this fascinating domain, or a student in a course, we invite you to dive in. Whether you single out a particular topic or make your way through most or all of the collection, you will be challenged and rewarded with new perspectives and new directions.

