CONTRIBUTORS

ANTHONY ARUNDEL obtained a bachelor's degree from Simon Fraser University in Canada and a master's in the economics of innovation from Maastricht University in Maastricht, the Netherlands. He is concurrently a Professorial Fellow at UNU-MERIT and an adjunct professor at the University of Tasmania in Australia. He has published extensively on business and public sector innovation. His research interests cover innovation measurement, knowledge transfer, innovation methods and strategies, and environmental innovation.

SUMA ATHREYE is Professor of Technology Strategy at Essex Business School. She has worked on several areas of technology management, including research on the technology-related activities of multinational enterprises, as well as the technology licensing behavior of firms. Her recent work has been on patent use by firms and she has studied the incentive effect of patents on firm profits and R&D, the role of technology leadership in encouraging patenting in open innovation contexts, and, more recently, on the barriers to the use of formal protection methods among UK firms.

GIANCARLO CARATTI is Head of Intellectual Property and Technology Transfer at the European Commission (EC), managing its intellectual property and promoting knowledge transfer. In 2015, he was deputy commissioner general for the EU participation in the World Expo Milano. He worked in the universities of Florence and Pisa as teaching and research assistant in mechanical engineering. He spent one year as visiting scholar at the Georgia Institute of Technology and worked in a private engineering firm before entering the EC in 1986.

BAOMING CHEN, Director, Comprehensive Development Institute (CDI), Chinese Academy of Science and Technology for Development (CASTED), Ministry of Science and Technology (MOST), Beijing, China. Baoming Chen obtained a PhD in economics from Renmin University in

Beijing, China. His research interests lie in S&T development strategy and policies. He is a core member of revising the law on promoting the transformation of S&T achievements. He leads many research projects on knowledge transfer, S&T development planning, international S&T cooperation, and other S&T policies.

DIRK CZARNITZKI is a full professor at the Department of Management, Strategy and Innovation at KU Leuven in Belgium. He holds a doctoral degree in economics from the University of Duisburg-Essen, and he has been a research fellow at the Centre for European Economic Research (ZEW), Mannheim, Germany, as well as post-doc at UC Berkeley before he joined KU Leuven in 2005. His research interests are mainly in the fields of the economics of innovation and applied micro-econometrics. The lines of research address topics such as the evaluation of public innovation policies, the economics of science, intellectual property rights, corporate governance and innovation, as well as knowledge and technology transfer including academic entrepreneurship. Dirk has published more than sixty articles in international, refereed journals including the Journal of Economics and Business Statistics, the Review of Economics and Statistics, Management Science, the European Economic Review, Journal of Applied Econometrics, Research Policy, and many others.

MINGLEI DING, Senior Research Fellow, CDI, CASTED, MOST, Beijing, China. Minglei Ding obtained a PhD in management science and engineering from Hebei University of Technology and holds postdoctoral certificates on applied economics in NanKai University. His research interests include S&T innovation policies and strategy, regional and industrial economics, innovation, and entrepreneurial management. He engages in a number of research projects on national and regional S&T, innovation policy, strategy, and planning. In recent years, he has been a core member of research projects for the Chinese thirteenth five-year STI planning and the law on promoting the transformation of S&T achievements.

NORDINE ES-SADKI joined UNU-MERIT as a researcher in January 2011. He obtained his bachelor's degree in economics from Maastricht University in 2009. In 2010, he obtained his master's degree in economics from the Erasmus University in Rotterdam with distinction. He is pursuing a PhD on the topic of knowledge flows from public research to firms. His research interests include knowledge transfer, intellectual

property rights, the measurement of science, technology and innovation, questionnaire design, surveys and their methodology, and the economics of regional innovation. He also works part-time as an economics teacher at a lyceum in Maastricht.

KERRY FAUL, Head, National Intellectual Property Management Office (NIPMO), Ministry of Science and Technology, Pretoria, South Africa. Kerry Faul completed a bachelor of science degree at the University of KwaZulu-Natal (formerly University of Natal (Pietermaritzburg)) in 1994, majoring in chemistry and biochemistry before going on to do a honors degree and thereafter a master of science degree in biochemistry. After a two-year stint of working in London and traveling extensively, she returned to complete a doctor of philosophy in biotechnology through the Institute of Wine Biotechnology at Stellenbosch University. From 2007 to 2011, Kerry was employed by Spoor & Fisher during which time she completed her legum baccalaureus and patent examination boards and was subsequently registered as a South African patent attorney, and admitted as an attorney of the High Court of South Africa. In December 2013, Kerry Faul was appointed as the Head of NIPMO responsible for ensuring implementation of the Intellectual Property Rights from Publicly Financed Research and Development Act (No. 51 of 2008).

BRUNO LE FEUVRE is senior statistical analyst at Department for Economics and Data Analytics of the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations based in Geneva, Switzerland. He holds a master of advanced studies in public administration and in information system management from the University of Lyon II, France. In 2001, he was hired by WIPO as an examiner at the International Bureau of the Patent Cooperation Treaty (PCT), and joined the statistics section in 2005 where he specialized in patent and PCT statistics.

PIPPA HALL, Director of Innovation and Chief Economist, UK Intellectual Property Office. Pippa Hall obtained a bachelor of science degree in economics at the University of Sheffield, United Kingdom. She also holds a masters in financial and industrial economics from Royal Holloway, University of London, United Kingdom. Her role is to ensure that the UK IPO's policy development activity focuses on key issues and is based on a robust evidence base. She is also responsible for developing strategies and policies to engage business and raise awareness of the importance of intellectual property rights.

INTAN HAMDAN-LIVRAMENTO, economist, Department for Economics and Data Analytics, World Intellectual Property Organization (WIPO), Geneva, Switzerland. Intan Hamdan-Livramento is an economist with experience in international trade law. She obtained her doctoral degree in economics from the École Polytechnique Fédérale de Lausanne (EPFL), France, and holds a master's in international law and economics from the World Trade Institute in Bern, Switzerland. She currently works in WIPO's chief economist division, working on issues at the intersection of the industrial organization and intellectual property rights. She was one of the four co-authors of the *World Intellectual Property Report*, one of WIPO's main economic publications since its inception in 2011. Intan previously worked at the World Trade Organization and the International Monetary Fund.

CAN HUANG, professor, head of Department of Innovation, Entrepreneurship and Strategy, and co-director of Institute for Intellectual Property Management at School of Management, Zhejiang University, Hangzhou, China. Can Huang holds a PhD in industrial management from the University of Aveiro, Portugal, an MSc in engineering and a BA in economics from Renmin University of China, Beijing, China. He is a senior editor of Management and Organization Review and a member of the editorial boards of the Journal of International Business Policy, Science and Public Policy, NTUT Journal of Intellectual Property Law and Management, African Journal of Science, Technology, Innovation and Development, International Journal of Innovation Studies, Science and Management (Ke Xue Yu Guan Li), and the UNESCO Science Report (2015 ed.). His research interests include innovation and intellectual property management and science and technology policy analysis.

NING HUANG, research fellow, CDI, CASTED, MOST, Beijing, China. Ning Huang obtained a bachelor of science degree from Shandong University and a doctor of economics degree from the University of International Business and Economics in China. He also holds postdoctoral certificates of applied economics from CASTED and Nankai University in China. He used to be a visiting scholar at the G20 Research Centre of the University of Toronto in Canada. His research focuses mainly on S&T strategy, innovation policies, and international economic and trade rules.

MICHAEL KAHN, advisor, and extraordinary professor, CREST and DST/NRF Centre of Excellence in Scientometrics and Science Policy, Stellenbosch University, Stellenbosch, South Africa. Michael Kahn obtained a PhD in theoretical physics from Imperial College, London, and a master's degree in education policy, planning and management from the University of London. His undergraduate degree is a BSc (hons) from the University of Cape Town. He works internationally as an advisor on R&D and innovation policy, strategy, planning, measurement and evaluation, and is principal investigator for the project on the Mobility of the Highly Skilled. He has authored 100 peer-reviewed journal articles, chapters in books, and books. He has served on the boards of a number of statutory bodies and NGO trusts.

KEUN LEE is a professor of economics at Seoul National University, and founding director of the Center for Economic Catch-up. He is an editor of Research Policy, an associate editor of Industrial and Corporate Change, and, since 2016, a council member of the World Economic Forum. He served as the president of the International Schumpeter Society (2016-2018), and as a member of the Committee for Development Policy of the UN (2014–2018), and was the winner of the 2014 Schumpeter Prize for his monograph on Schumpeterian Analysis of Economic Catch-Up (2013, Cambridge University Press). He obtained his PhD in economics from the University of California, Berkeley. One of his most cited articles is a paper on Korea's technological catch-up published in Research Policy, with 1,081 citations (Google Scholar). His H-index is now thirty-seven, with ninety-five papers with more than ten citations. His latest book, The Art of Economic Catch-Up: Barriers, Detours and Leapfrogging in Innovation Systems, was published by Cambridge University Press in 2019.

GEORG LICHT is Head of the research department of Economics of Innovation and Industrial Dynamics at the Centre for European Economic Research (ZEW), in Mannheim, Germany. He has held this position since June 1994. He gained his doctoral degree at the University of Augsburg and holds a degree in economics from the University of Heidelberg. Research interests include the economics of innovation and technical change as well as the economics of small firms and entrepreneurship. He was engaged for some years in the development of the Community Innovation Survey (CIS) and innovation surveys in Germany in manufacturing and service industries. He is consultant to the OECD, the EU Commission and the German Federal Ministry of

Education and Research in the area of innovation and technology policy. He has been a member of several expert panels in science and innovation policy.

FERNANDA MAGALHÃES, specialist in public policies and government management, Brazilian Federal Government. She has worked on several areas of public policy, including technological innovation, sustainable development, and international trade. Her previous work was on fostering knowledge transfer from academia and research institutes to the private sector, and she is currently working on environmental issues, biotechnology and nontariff barriers to trade.

PHILIPPE KUHUTAMA MAWOKO, a Congolese national (Democratic Republic of Congo (DRC)), Philippe Kuhutama Mawoko is the interim director of the African Union Observatory for Science, Technology, and Innovation (AOSTI) based in Malabo, the Republic of Equatorial Guinea. He joined the Commission of the African Union in 2011 to help set up AOSTI. He is presently teaching mathematics and statistics at the newly created University of Kwango in DRC. Dr. Mawoko currently serves on the advisory board of the United Nations University Maastricht Economic and Social Research Institute on Innovation and Technology (UNU-MERIT). He is also a member of the advisory board of the Global Innovation Index. Prior to joining AOSTI, he coordinated the African Science, Technology & Innovation Indicators Initiative (ASTII) and the African Mathematical Institutes Network for the Office of Science and Technology (OST) of the NEPAD Planning & Coordinating Agency. Before that, he worked as the program manager for the NEPAD e-Africa Commission. Former minister of post and telecommunications in the DRC, Dr. Mawoko led the initial policy reform in the sector. He also served as senior consultant, forecasting new telecommunication products and services in the marketing division of Telkom South Africa. He worked as a senior consultant at NedCoBank in South Africa. In the 1990s, he took a lectureship at the University of Zimbabwe in Harare and at the National University of Lesotho in Roma. He holds a PhD in mathematics from the University of Salzburg in Austria (1988).

FABIO MONTOBBIO is Associate Professor of economics at the Department of Economic Policy, Università Cattolica del Sacro Cuore in Milan, Italy, contract professor at Bocconi University and visiting fellow at iCRIOS (Bocconi University) and BRICK at the Collegio

Carlo Alberto, Turin, Italy. Fabio Montobbio's research interests include the economics of innovation, the economics of patents, university knowledge transfer, the new economics of science and technology, and development. His teaching activities include industrial economics, economics of innovation, and intellectual property rights. He has several publications in international journals, including the Scandinavian Journal of Economics, Industrial and Corporate Change, World Development, Research Policy, and the Journal of Economic Behavior and Organization.

FERNANDA DE NEGRI is a research leader at the Institute for Applied Economic Research (Ipea). She holds a PhD in economics from the University of Campinas (UNICAMP) and was visiting researcher at the Massachusetts Institute of Technology in 2015 and 2017 and at Harvard University in 2017. She has always been interested in the effects of science and new technologies on the economy, business competitiveness, and productivity. In the public sector, she held positions related to public policies for productivity and science and technology: she was economic advisor to the Minister of Development, Industry and Foreign Trade (2008) and head of the Monitoring and Evaluation Office of the Ministry of Science and Technology (2010-2012). She was also director (2012-2017) and deputy director (2009-2010) of Ipea. She is the author of several articles and books and received the BNDES economics award for her dissertation on the commercial performance of foreign companies in Brazil. In 2014, the book she organized on *Productivity in* Brazil was a finalist in one of the most prestigious literature prizes in the country: the Jabuti Prize.

CHUNYAN PENG, senior research fellow, CDI, CASTED, MOST, Beijing, China. Chunyan Peng obtained a bachelor of economics from Shandong University of Finance and Economics in Jinan and a master's and a doctorate of economics from Renmin University of China. She has contributed to several working papers on Chinese innovation strategy, the law on promoting the transformation of S&T achievements, and Chinese technology transfer policies. She has authored and co-authored several papers and books on innovation.

AMIT SHOVON RAY is Professor of economics at the Centre for International Trade and Development of the School of International Studies in Jawaharlal Nehru University, New Delhi. He was educated at Presidency College, Calcutta, and at the University of Oxford from where

he received his DPhil in economics in 1988. Professor Ray is a development economist and his primary research areas include the economics of technology and intellectual property rights, the economics of health, the pharmaceutical industry, WTO-TRIPS, foreign direct investment, and a wide range of policy issues pertaining to India's development experience. He has over seventy-five research publications including six books and short monographs plus several articles in reputed international journals and edited volumes. Professor Ray has held teaching and research positions at premier universities and institutions in India and abroad, including Oxford University Institute of Economics and Statistics, International Food Policy Research Institute, Washington, DC, Jawaharlal Nehru University, New Delhi, University of Calcutta (Kolkata), Indian Institute of Technology, New Delhi. He has also served as director of the Centre for Development Studies in Trivandrum. He has been a consultant to various national and international bodies, including the Planning Commission (Government of India), the World Bank, and UNCTAD.

RAGAN ROBERTSON, technology transfer officer, University of California, Los Angeles and AUTM cabinet member, Metrics and Surveys, United States of America (U.S.). Ragan Robertson obtained a PhD in biological sciences from Columbia University in New York City. He has been actively involved in knowledge transfer for over ten years, focusing on patent protection, technology development, marketing, startups, and licensing within the life science space. He is the lead editor of the AUTM US Licensing Activity Survey, an analytical report of the patenting, licensing, and startup activities performed by US university and research institution technology transfer offices. He has also authored five peer-reviewed scientific publications.

FEDERICA ROSSI, senior lecturer, Department of Management, Birkbeck, University of London, United Kingdom. Dr. Federica Rossi holds a PhD and MSc in economics (University of Turin, Italy) and a BSc in political economy (University of Modena and Reggio Emilia, Italy). She is an expert in the economics of innovation, including innovation and higher education policy. She has published extensively in peer-reviewed journals on innovation policy evaluation, university-industry collaboration networks, universities' knowledge transfer management, and performance evaluation.

BHAVEN SAMPAT is an associate professor in the Department of Health Policy and Management at Columbia University and a research associate

at the National Bureau of Economic Research. Most of his research focuses on issues at the intersection of health policy and innovation policy. His current work includes (1) various empirical studies of drug and life science patent policy in the U.S. and developing countries; (2) evaluating the validity of different approaches to measure science, innovation and science–technology linkages; (3) examining whether and when science is self-correcting; and (4) assessing the impact of federal indirect cost recovery policy on the biomedical research enterprise. His previous work includes research on the political economy of the national institutes of health, patent examination and patent quality, and the roles of academic patenting in university–industry knowledge transfer. His has written numerous articles and a book on the effects of the US Bayh-Dole Act on academic patenting and knowledge transfer.

HOCHUL SHIN, researcher, Center for Distributive Justice, Seoul National University, Republic of Korea. Hochul Shin obtained a PhD in economics from Seoul National University in Republic of Korea. His research area includes innovation, trade, institution, growth, and inequality. He has published several papers about trade, industrial policy, finance, and inequality in peer-reviewed journals.

SI KYONG SUNG, deputy director, Intellectual Property Utilization Division, Korean Intellectual Property Office (KIPO), Daejeon, Republic of Korea. Si Kyong Sung obtained a bachelor of mechanical engineering and a master of mechanical engineering from Korea Advanced Institute of Science and Technology (KAIST) in Daejeon, Republic of Korea. He was a senior research engineer in LG Electronics and co-invented several system air-conditioners.

H.J.M. (HENRI) THEUNISSEN, chief valorization officer of Maastricht University and the Brightlands Maastricht Health Campus and CEO of Knowledge Transfer Funds BV. Henri graduated in biology (Radboud University Nijmegen), holds a PhD in molecular biology (NKI, University of Amsterdam), and was a post-doc in immunohematology (Central Lab of Blood Transfusion, Amsterdam). He worked at Organon International (later Schering-Plough and Merck) in the cardiovascular and reproductive medicine programs and as head of the genomics & bioinformatics group. As an expat in Cambridge, Massachusetts, U.S., he focused on biotechnology, immunology, and oncology as a senior director, Global Strategy, Portfolio Management and Research

Alliances, and as vice president and officer of Diosynth RTP, North Carolina, U.S. He was also an MT member of Nobilon BV (Boxmeer) for business development and strategic marketing of human vaccines.

ANTENOR CESAR VANDERLEI CORRÊA, science and technology senior analyst, Ministry of Science, Technology, Innovations and Communications, Brazilian Federal Government. Antenor Cesar Vanderlei Corrêa has worked for the Ministry of Science, Technology, Innovations, and Communications (MCTIC) since 1985, where he has held various positions in sectors related to industrial, scientific, and technological policy, especially in the area of information and communication technology. He holds a bachelor's degree in engineering from the University of Brasilia, Brazil, and a master's degree in manufacturing systems engineering from the University of Warwick, United Kingdom.

LIEN VERBAUWHEDE KOGLIN, counsellor, IP Policies for Universities, Small and Medium-sized Enterprises and Entrepreneurship Support Division, World Intellectual Property Organization (WIPO). Lien Verbauwhede Koglin obtained a bachelor of law from the Catholic University of Leuven (KUL), Belgium, and the University of Granada, Spain. She also holds a master of law from the Wilhelms-University of Münster, Germany. She has co-authored a series of WIPO publications on IP for businesses and is the main author of the WIPO IP Policy Template for Academic and Research Institutions. She currently spearheads WIPO's activities to assist universities and research institutions in designing and implementing IP policies, and facilitating academic knowledge transfer and commercialization. Before joining WIPO, she was an IP lawyer at Linklaters, Brussels, and Lalive & Partners, Geneva.

BART VERSPAGEN is the director of UNU-MERIT and the chair of international economics, Economics Department of Maastricht University, the Netherlands. Bart is an economist specialized in the economics of innovation, growth, and development. He did his undergraduate studies at the University of Limburg (now called Maastricht University) in Maastricht from 1984 to 1988. He obtained a PhD from the same university in 1992. During the subsequent five years, he held a scholarship from the Royal Netherlands Academy of Arts and Sciences (KNAW). In 1998, he became a professor at Eindhoven University of Technology. In 2008, he moved back to Maastricht University, where he became a professor of international economics. In

2012, he became director of UNU-MERIT. Verspagen's research interests are centered on the process of economic growth and development, especially its relation to innovation and technological change. His research field also covers areas such as international trade, development economics, industrial dynamics, economic history, and applied econometrics, statistics, and mathematical modeling. With regard to the last, he has mainly been applying evolutionary models to economic issues.

CRISTIANE VIANNA RAUEN is general coordinator of professional education at the Brazilian Ministry of Education. She holds a PhD in economics from the University of Campinas (UNICAMP) and was visiting doctoral researcher at Columbia University in 2011. Throughout her career, Cristiane has specialized in topics associated with science, technology and innovation, performing research, teaching, consulting, and public policy formulation activities. She has been a Brazilian civil servant since 2011, holding positions in different organizations, such as the National Institute of Metrology, Quality, and Technology (Inmetro, 2011–2013), where she served as leader of the technology project incubator; Ministry of Science, Technology, and Innovation (MCTI, 2013–2019), where she held the position of advisor to the executive-secretary; Brazilian Institute of Information in Science and Technology (IBICT, 2015–2017), where she worked as a researcher; Institute for Applied Economic Research (Ipea, 2015–2018), where she served as visiting researcher; and, currently, is with the Ministry of Education.

ROSEMARY WOLSON has a bachelor of sciences (hons) in microbiology, a bachelor of law (LLB) and a master of philosophy (MPhil), all from the University of Cape Town. She chairs a committee of the Association of University Technology Managers (AUTM) which awards scholarships to new entrants to the profession from developing economies and is a member of the Public Interest Intellectual Property Advisors Advisory Board. She has previously served on the National Intellectual Property Management Office Advisory Board; the Southern African Research & Innovation Management Association Committee; the NEPAD-Southern Africa Network for Biosciences Working Group on Intellectual Property, Indigenous Knowledge and Benefit-Sharing Guidelines; the steering committee for Tilburg University, the Netherlands, Intellectual Property Rights and Development Project and as a lead analyst for the Global Energy Assessment Knowledge Module on Policies for Capacity

Development. She is passionate about innovation and its potential to change lives for the better.

SACHA WUNSCH-VINCENT is Head of section in the Department for Economics and Data Analytics at the World Intellectual Property Organization (WIPO) and co-editor of the Global Innovation Index. He joined WIPO in 2010 to help set up WIPO's economics work under the chief economist, including the *World Intellectual Property Report*. Before joining WIPO, he was an economist at the OECD Directorate for Science, Technology, and Industry for seven years. Before that, he was Swiss national science fellow at the Berkeley Center for Law and Technology (University of California, Berkeley, U.S.) and the Peterson Institute for International Economics (Washington, DC). Sacha holds a master in international economics from the University of Maastricht with a master's thesis at MERIT and a PhD in economics from the University of St. Gallen, Switzerland. He teaches international economics at Sciences Po Paris, and the World Trade Institute in Bern.

LIU XIA graduated from Shanghai University of Finance and Economics, after which she gained her doctorate in quantitative economics in the European Center for Advanced Research in Economics and Statistics (ECARES) from Université de Bruxelles. She has worked as an academic visitor in the Center for Law and Economics at ETH Zurich and as a post-doctorate researcher in the School of Management, Zhejiang University, China. Her research fields include innovation policy, IP management, and applied micro-econometrics. She currently belongs to the Shanghai International College of Intellectual Property, Tongji University, China.

JUAN YANG, research fellow, CDI, CASTED, MOST, Beijing, China. Juan Yang obtained a bachelor of economics from Central China Normal University and got her master of economics from Zhongnan University of Economics and Law, Wuhan, China. She also holds a doctorate degree in economics from the Renmin University of China. She used to be a visiting scholar in Boston University and a clinical researcher for the Shriners Hospitals for Children based in Boston, and also a fellow of WIPO in Geneva, Switzerland. She contributes to some joined research projects on China's foreign direct investment and IP performance evaluation. She is a core member of research projects on China's S&T open innovation strategy and policies.

HU ZHIJIAN is president of the Chinese Academy of Science and Technology for Development (CASTED). He joined CASTED as a general secretary in 2009 to build CASTED into a national S&T strategic think tank. Before joining CASTED, he served as deputy director general, in the Department of Policy, Regulations and Reform of the China's Ministry of Science and Technology. His book *National Innovation System: Theoretical Analysis and International Comparison* was published by China's Social Sciences Academic Press. He holds a PhD in innovation and management from the Chinese Academy of Sciences. He also functions as secretary general of the China Federation of Scientific and Technological Institutes, vice chairman of the China Law Association on Science and Technology, and governing board member of the World Economic Forum.

HAO ZHOU, Director of Statistics, Statistics and Data Analytics, Department for Economics and Data Analytics, WIPO. Hao Zhou obtained a bachelor of science in physics from Peking University. He worked in the Chinese Patent Office as patent examiner and IPC coordinator, then for WIPO as PCT examination coordinator, IT business analyst and senior statistical analyst. He is in charge of statistical data for WIPO publications.