

# *The National Academies of* SCIENCES • ENGINEERING • MEDICINE

## **Sustainable and Resilient Supply Chains with Emerging Technologies: Workshop Series February 2021**

**Overview:** The workshop series will address opportunities, challenges, and environmental implications of increasing local inclusion and community participation in global value chain networks by using new technologies to strengthen resilience and sustainability in the face of recurring disruptions (e.g., natural disasters, disease outbreaks, demand/supply shifts). The discussions will explore the feasibility of introducing advanced manufacturing, logistics and decision-making under alternative supply chain scenarios in different sectors, with a view of strengthening the resilience of communities and adopting far more environmentally and economically sustainable consumption and production approaches in support of the United Nations Sustainable Development Goals.

### **Workshop III: Emerging Technologies Wednesday, February 17, 2021 (all times are U.S. Eastern Time)**

**Brief Background:** The pandemic has raised global awareness about the fragile economic, social, and environmental underpinnings of our world today and prompted a debate on how to improve preparedness for disasters. Against the background of achieving the Sustainable Development Goals, *The World in 2050* initiative ([TWI2050.org](https://www.twi2050.org)) offers an integrated framework to capture the global, regional and local dynamics of future change on which to construct integrated strategies to recover from COVID-19 and ‘building back better.’ These six transformations focus on (1) education and skills; (2) health and wellbeing; (3) clean energy and sustainable industry; (4) sustainable use of food, land, water and oceans; (5) sustainable cities and communities; and (6) digital technologies. Taken together, they provide an action agenda for governments, businesses, and civil society to make our societies more inclusive and sustainable.

Workshop III will explore the potential role of emerging technologies during the coming recovery and rebuilding phase, with a special focus on trends that will impact:

- Supply chains of the future (e.g., redundancy planning, transparency of supplier networks, environmental, social, and governance initiatives);
- Factories and manufacturing processes of the future (e.g., additive manufacturing, automation, shift towards service intensive coordination, reskilling requirements); and
- Local technology initiatives at the level of megaregions, cities, and communities (e.g., infrastructure planning in the age of e-commerce, integrated delivery of government services, data-driven technology ecosystems).

Drawing on policy blueprints for economic recovery and examples from different industries and geographies, the workshop offers an opportunity to engage with academics, global policy networks, and industry practitioners to discuss future trends and pressing policy issues. An overriding concern is the extent to which these emerging technologies offer solutions to real-world problems. Pioneering initiatives in this space include, among others, [50 Breakthroughs](#), [SPACE 10](#), or the [Global Lighthouse Network](#).

- 12:00 pm      **Welcome and Goals for Workshop Series**  
Klaus Tilmes (Chair), Senior Policy Adviser and Economic Development Consultant  
Franklin Carrero-Martinez, National Academies of Sciences, Engineering, and Medicine
- 12:05 pm      **Framing Remarks: The State of Technological Innovation for Sustainability and Resilience**  
Yossi Sheffi, Massachusetts Institute of Technology
- 12:35 pm      **Panel: Perspectives from Global, Corporate, and Local Levels**  
Moderator: Banning Garrett, Singularity University
- I: Global Supply Chains of the Future**
- Daria Taglioni, The World Bank
- II: Industries/Factories of the Future**
- Francisco Betti, World Economic Forum
  - Drew Endy, Stanford University
- III: Innovative Technology Applications at Subregional and City Levels**
- Shireen Santosham, Plenty
- 1:55 pm      **Summary Remarks**  
Klaus Tilmes (Chair), Senior Policy Adviser and Economic Development Consultant
- 2:00 pm      **Adjourn**

### **Selected Background Readings**

Sheffi, Y. 2020. The New (Ab)Normal: Reshaping Business and Supply Chain Strategy Beyond Covid-19. Available at <https://sheffi.mit.edu/new-abnormal>

World Economic Forum. 2020. Unlocking Technology for the Global Goals. Available at [http://www3.weforum.org/docs/Unlocking\\_Technology\\_for\\_the\\_Global\\_Goals.pdf](http://www3.weforum.org/docs/Unlocking_Technology_for_the_Global_Goals.pdf)

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**Sustainable and Resilient Supply Chains with Emerging Technologies**

**Workshop III: Emerging Technologies**  
**Wednesday, February 17, 2021**

**Moderator and Speaker Biographical Information**

**KLAUS TILMES (Planning Committee Chair)** is a Senior Policy Adviser and Economic Development Consultant who most recently worked with the Office of the World Bank President to develop the institution's strategy on emerging technologies and scaling adoption through financial assistance, policy advice, and partnerships. He also works closely with the African Center for Economic Transformation and the United Nations Science Technology and Innovation (STI) Forum. Previously, Mr. Tilmes served as Director of the Trade and Competitiveness Global Practice at the World Bank, overseeing operations in Sub-Saharan Africa and the Middle East and global teams on Trade and Competition Policy and Innovation and Entrepreneurship. During his 30-year career at the World Bank, Mr. Tilmes held positions as Director of Strategy and Operations in the Financial and Private Sector Development Network; Knowledge Strategy Advisor; Manager at the Independent Evaluation Group; and Advisor, Corporate Strategy Group. He holds a Master's degree in Public Administration from Harvard University and a Master's in Economics from the University of Mannheim.

**FRANCISCO BETTI** joined the World Economic Forum in May 2015. He is an international development professional and is currently leading the platform for Shaping the Future of Advanced Manufacturing and Production, which was launched by the Forum at its Annual Meeting 2017, upon request of world-leading governments and companies. The platform is helping global leaders anticipate how advanced manufacturing technologies are transforming factories, business models and partnerships, and to understand the implications for the economy, society, and environment in order to shape a more inclusive future. Prior to joining the World Economic Forum, Francisco worked for PricewaterhouseCoopers SA in Geneva, Switzerland, primarily running management consulting projects for international organizations.

**FRANKLIN CARRERO-MARTINEZ (Staff)** joined the National Academies of Sciences, Engineering, and Medicine in 2018 where he directs the Global Sustainability and Development and the Science and Technology for Sustainability program within the division of Policy and Global Affairs. Prior to this appointment, he was the Acting Deputy Science and Technology Adviser to the Secretary of State. Dr. Carrero-Martínez holds a B.S. in biology, with honors from the University of Puerto Rico (UPR), a Ph.D. in cell and developmental neurobiology, and a certificate in business administration from the University of Illinois at Urbana-Champaign. Previously, Dr. Carrero-Martínez held appointments as associate professor at the UPR, Mayagüez, Adjunct Professor at the UPR Medical Science Campus, and as visiting scholar at Duke University, Massachusetts Institute of Technology, and Japan's Institute of Genetics. Dr. Carrero-Martínez started his career in science diplomacy and policy as the American Association for the Advancement of Science's Roger Revelle Fellow in Global Stewardship. He served this prestigious fellowship with a joint appointment between the Office of the Science and Technology Adviser to the Secretary of State (STAS) and the National Academy of Sciences. At the end of his fellowship, he served as program director at the National Science Foundation supporting the foundation's diplomatic and representational obligations, while managing a portfolio of international basic science collaboration grants before returning to STAS in 2016. In this role he provided senior officials with analysis, guidance, recommendations and strategic planning to anticipate the foreign policy impacts of emerging STI issues,

built STI capacity within the Department, and engaged the National Security Innovation Base to promote Department priorities.

**DREW ENDY** is a member of the bioengineering faculty at Stanford University and BioBricks Foundation president (biobricks.org). His research teams pioneered amplifying genetic logic, rewritable DNA data storage, reliably-reuseable standard biological parts, and genome refactoring. Dr. Endy helped launch the new undergraduate majors in bioengineering at both Massachusetts Institute of Technology and Stanford University; he also co-founded the iGEM competition, a global genetic engineering “olympics” now engaging over 6,000 students annually (igem.org). In 2013 the White House recognized Dr. Endy for his work on open-source biotechnology and, more recently, he received an honorary doctorate from the Technische Universiteit Delft. Dr. Endy has served on the U.S. National Science Advisory Board for Biosecurity and the Committee on Science, Technology, & Law; he currently serves on the World Health Organization’s Smallpox Advisory Committee. Dr. Endy was a co-founder of Gen9, Inc., a DNA construction company; he returned to serve as a director while Gen9 was successfully acquired. Dr. Endy worked briefly with the Rapid Evaluation team at Google [X] and also served on the building project team for the Shriram Center at Stanford. He is a founding co-director of the NIST/Stanford Joint Initiative for Metrology in Biology (jimb.stanford.edu). Esquire magazine recognized Dr. Endy as one of the 75 most influential people of the 21st century. Dr. Endy received his Ph.D. in Biotechnology & Biochemical Engineering from Dartmouth College and his M.S. in Environmental Engineering and B.S. in Civil Engineering from Lehigh University.

**BANNING GARRETT (Planning Committee Member)** is Faculty of Global Policy and Development at Singularity University. He is a Washington-based strategic thinker, writer, keynote speaker, and entrepreneur who focuses on the impact of exponential technologies and their intersection with long-term global trends, urbanization, and geopolitics. Dr. Garrett was founding director of the Atlantic Council’s Strategic Foresight Initiative and created and led the Council program on the implications of emerging technologies and its Urban World 2030 program. He was Director of the Council Asia Program (2003-2012) and in 2006 established and subsequently led the Council’s cooperation with the National Intelligence Council (NIC) in production of the NIC unclassified, quadrennial long-term global trends assessments, including Global Trends 2025: A Transformed World (2008) and Global Trends 2030: Alternative Worlds (2012). Dr. Garrett has also worked on US-China relations since the 1970s and has made sixty trips to China since 1981 for consultations with Chinese officials and analysts as well as numerous similar visits to Russia, Taiwan, Japan, and South Korea. He also traveled with the National Intelligence Council on more than a dozen trips to most of the G-20 countries in Asia, Africa, Latin America, and Europe for global trends consultations. Dr. Garrett received his B.A. in the History of Social Thought and Institutions from Stanford University and his Ph.D. in Politics from Brandeis University.

**SHIREEN SANTOSHAM** is Head of Strategic Initiatives at Plenty, a Bay Area-based startup focused on indoor vertical farming to produce sustainably produced healthy, fresh foods. Prior to this appointment, Ms. Santosham served as chief innovation officer for the San Jose Mayor’s Office of Technology & Innovation from 2016 to 2020. She launched the city’s Smart City Vision initiative as a mechanism for growing equity and social justice in the Bay Area tech city. Previously, Ms. Santosham worked at the GSMA where she was a Director in the Mobile for Development group that aimed to close the digital divide for base of the pyramid populations in the developing world through mobile technology and the internet. She has extensive experience working on innovative initiatives across sectors, including working at McKinsey & Company, with international NGOs, and as an impact investor at Vulcan Capital. Ms. Santosham holds an M.B.A. from Harvard Business School, an M.P.A. from Harvard Kennedy School, and a B.S. and B.A. from the University of Pennsylvania. She is a term member at the Council on Foreign Relations and a Global Governance Futures Fellow at the Robert Bosch Foundation.

**YOSSI SHEFFI** is the Elisha Gray II Professor of Engineering Systems at Massachusetts Institute of Technology (MIT), where he serves as Director of the Center for Transportation and Logistics. He is an expert in systems optimization, risk analysis and supply chain management. Dr. Sheffi is the author of several award winning books, including “The Resilient Enterprise” (MIT Press, 2005), “Urban Transportation Networks” (Prentice Hall, 1985), “Logistics Clusters” (MIT Press, 2012), “The Power of Resilience,” (MIT, 2015), and “Balancing Green: When to Embrace Sustainability in Business (and When Not to)” (MIT Press, 2018). In his latest book “The New (Ab)Normal: Reshaping Business and Supply Chain Strategy beyond Covid-19,” Dr. Sheffi maps how the COVID-19 pandemic impacted business, supply chains, and society and exposes the critical role supply chains play in helping people, governments, and companies to manage the crisis. The book has been named the 2020 BIBA Award winner in the section of Non-fiction Business/Global Economics. Dr. Sheffi has consulted with leading enterprises and founded or co-founded five successful companies: LogiCorp (acquired by Ryder in 1994); PTCG (acquired by Sabre in 1996); e-Chemicals (acquired by AspenTech in 2001); Logistics.com (acquired by Manhattan Associates in 2003), and Syncra Systems (acquired by Retek in 2004). He obtained his B.Sc. from the Technion in Israel, and his S.M. and Ph.D. from MIT.

**DARIA TAGLIONI** is Research Manager, Trade and International Integration, Development Research Group at the World Bank. She joined the World Bank Group in 2011 as Senior Trade Economist in the International Trade Department of the Poverty Reduction and Economic Management Network (PREM). Since then, she has held various positions and roles, including Team-Task Lead for the World Development Report 2020, Principal Economist in the International Finance Corporation, and World Bank’s Global Lead on Global Value Chains. Previously, she worked as Senior Economist at the European Central Bank (ECB) and as Economist at the Organisation for Economic Cooperation and Development (OECD). Dr. Taglioni has published in the *American Economic Review*, *Journal of International Economics*, and other scholarly journals. Her work has been featured in international media outlet such as the New York Times and Forbes. She authored various books on international trade. She holds a Ph.D. in International Economics from the Graduate Institute, Geneva.