

INDIA – CANADA DIGITAL COLLABORATION

Digital Technology and AI for Precision Agriculture

October 23 Program

Together with Asia Pacific Foundation and IITM-Pravartak Technologies Foundation in India, Canada's Digital Technology Supercluster is hosting a series of workshops to explore the opportunity for industry and research collaborations between Canada and India in regenerative agriculture and the role that digital technologies, computational chemistry, cyber-physical systems, machine learning, artificial intelligence, robotics and automation can contribute towards a sustainable agricultural future.

Virtual Workshop Series

October 23, 2020 (7:30-10AM PT 8:00-10:30PM IST)	Towards Sustainability: A Discussion on Regenerative Agriculture
October 30, 2020 (7:30-9:30AM PT 8:00-10:30PM IST)	Emerging Technologies in Precision Agriculture
November 6, 2020 (6:30-9AM PT 8:00-10:30PM IST)	Big Data in Agriculture

Registration

As a reminder, you must register for each individual session. If you have not done so, please **[REGISTER NOW](#)** and register for the remaining sessions.

OCTOBER 23, 2020: TOWARDS SUSTAINABILITY: A DISCUSSION ON REGENERATIVE AGRICULTURE

As we near a total population of 8 billion people, it has become critical to re-define our approaches to agriculture for a sustainable future. Regenerative agriculture is a conservation and rehabilitation approach to food and farming systems that focuses on topsoil regeneration, increasing biodiversity, improving the water cycle, enhancing ecosystem services, supporting biosequestration, increasing resilience to climate change, and strengthening the health and vitality of farm soil.¹

In this workshop, we will explore the concepts of:

- Zero-budget farming
- Soil-based technologies
- Optimized and predictive irrigation systems

SESSION AGENDA

Time	Event Description
07:30 PDT 20:00 IST	Welcome by Sue Paish, CEO of The Digital Technology Supercluster
07:40 PDT 20:10 IST	Opening Remarks <ul style="list-style-type: none"> • Mr. Simon Kennedy, Deputy Minister Innovation, Science and Economic Development, Government of Canada • Prof. Ashutosh Sharma, Secretary Department of Science and Technology, Government of India
08:00 PDT 20:30 IST	Keynotes: <ul style="list-style-type: none"> • Regenerative Agriculture - Karn Manhas, Terramera • Zero-Budget Farming - Mr. Vijaykumar, Rythu sadhikara samstha (Ry.S.S)
08:40 PDT 21:10 IST	<i>Health Break</i>
08:50 PDT 21:10 IST	Company Presentations and Moderated Q&A: <ul style="list-style-type: none"> • Accurate Soil Moisture detection using radio waves - Prof. Devendra Jalihal Department of Electrical Engineering, IIT Madras and Mr. K. Sakthivelu, RF Wave Technologies Pvt Ltd • Earth Observation for Precision Agriculture - Chris Rampersad, Urthecast
09:20 PDT 21:50 IST	Company Presentations and Moderated Q&A: <ul style="list-style-type: none"> • Intelligent Soil Moisture Prediction and Irrigation Systems - Prof. Arun K. Thangirala, Department of Chemical Engineering, IIT Madras • Using Proximal and Remote Sensing Technologies to Support Regenerative Agriculture - Prof. Sean Smukler, University of British Columbia • Sustainability through Digital Agriculture - Bruce Ringrose, Farmers Edge
10:00 PDT 22:30 IST	Closing Remarks

¹ Wikipedia https://en.wikipedia.org/wiki/Regenerative_agriculture

SESSION HOSTS AND FACILITATORS



Sue Paish, CEO of The Digital Technology Supercluster

Sue has led transformation and innovation across professional services, healthcare and technology - driving business growth, and leading large-scale organizational change. Sue is the inaugural CEO of Canada's Digital Technology Supercluster – one of the most innovative and meaningful initiatives for the Canadian economy in a generation.

In her role as CEO of Canada's Digital Technology Supercluster (CDTS), Sue will oversee innovative cross-sector projects and initiatives that will digitally transform Canada's leading industries, create jobs and grow our economy. Together with the 350+ member organizations, CDTS will lead multi-dimensional collaborations producing innovative digital solutions to industry issues and capture new economic opportunities, making Canada a global leader in digital technology.



Professor V. Kamakoti, Professor, Department of Computer Science and Engineering, IIT Madras

V. Kamakoti is a Professor of Computer Science and Engineering, IIT Madras; Associate Dean, Industrial Consultancy and Sponsored Research; Member of National Security Advisory Board and Chairman of The Artificial Intelligence Task Force constituted by the Ministry of Commerce and Industry, Government of India.



Stewart Beck, President and CEO of the Asia Pacific Foundation of Canada

Stewart Beck is the President and CEO of the Asia Pacific Foundation of Canada. Prior to joining APF Canada, Mr. Beck served as the Canadian High Commissioner to the Republic of India with concurrent accreditation to the Kingdom of Bhutan and to Nepal. He joined Canada's Department of External Affairs and International Trade (now Global Affairs Canada) in 1982 and served abroad in the United States, Taiwan, and the People's Republic of China. In Ottawa, he held a number of progressively more senior positions, including Director General of the North Asia Bureau, Director General Responsible for Senior Management and Rotational Assignments, and Assistant Deputy Minister for International Business Development, Investment, and Innovation. He was Consul General in Shanghai and prior to his posting to India, he was Consul General in San Francisco.



Simon Kennedy, Deputy Minister Innovation, Science and Economic Development, Government of Canada

Simon Kennedy was named Deputy Minister of Innovation, Science and Economic Development, effective September 3, 2019.

Previously, he served as Deputy Minister of Health from January 2015. During his tenure at Health Canada, that department took on a national leadership role in responding to the opioids crisis; negotiated agreements with the provinces and territories to allocate \$11 billion in new funding to home care and mental health services; and launched important reforms to pharmaceutical pricing, nutrition labelling, and vaping and tobacco product packaging. Mr. Kennedy

also oversaw Health Canada's implementation of the government's initiative to legalize and regulate cannabis, including passage of the *Cannabis Act*.

Mr. Kennedy began his career with the public service in 1990 and has served in a variety of progressively senior roles in seven different organizations, including in six deputy minister-level appointments at the Privy Council Office; Industry Canada; Foreign Affairs and International Trade Canada; Health Canada; and Innovation, Science and Economic Development Canada. As the Canadian lead on the bi-national Beyond the Border Working Group, he negotiated with the White House the 2011 Canada-U.S. Action Plan for Perimeter Security and Economic Competitiveness. He also served as the Prime Minister's personal representative, or "Sherpa," to the G20 from 2012 to 2014.

He holds a Bachelor of Public Relations from Mount Saint Vincent University and a Master of Science in Communications Management from Syracuse University and is a graduate of INSEAD's Advanced Management Programme. Mr. Kennedy also received his ICD.D designation from the Institute of Corporate Directors (ICD) and is co-chair of the ICD Ottawa Chapter. He has served on the boards of a variety of organizations, most recently the Mental Health Commission of Canada, the Canadian Institute for Health Information and the Governing Council of the Canadian Institutes of Health Research, among others.



Ashutosh Sharma, Secretary Department of Science and Technology, Government of India

Ashutosh Sharma is a Secretary to the Government of India since January 2015, heading the Department of Science and Technology (DST), where he helped initiate several new programs related to: infrastructure and human capacity building; innovation and startups; R&D in advanced manufacturing, waste processing, clean energy and cyber-physical systems; industry-academia cooperation; science communication; women scientists; and major international collaborations in the areas of priority for the nation.

Ashutosh received his PhD from the State University of New York at Buffalo (SUNYAB; 1988), his MS from the Pennsylvania State University (1984) and B.Tech. from IIT Kanpur (1982). He has been a professor (1997-), an Institute Chair Professor (2007-) and the Head (2003-05) of Chemical Engineering, and the founding Coordinator of Nanosciences Center and Advanced Imaging Center at the Indian Institute of Technology at Kanpur.

Ashutosh's research contributions are highly interdisciplinary, spanning a wide spectrum in nanotechnology; thin polymer films; nanocomposites and devices in energy, health and environment; functional interfaces; micro/nano-mechanics of soft matter; nano-patterning and nanofabrication; colloid and interfacial engineering; biomaterials & biosurfaces; wetting and adhesion. He has published over 350 peer reviewed papers, filed over 15 patents, given over 150 invited or key note conference presentations and mentored a successful nanotechnology startup.

Ashutosh is a recipient of numerous honors and awards including the inaugural Infosys Prize in Engineering and Computer Science, TWAS Science Prize of the World Academy of Sciences, Bessel Research Award of the Humboldt Foundation, J. C. Bose Fellowship, S. S. Bhatnagar Prize, Homi J. Bhabha Award of UGC, The Syed Husain Zaheer Medal and the Meghnad Saha Medal of INSA, Distinguished Alumni Awards of IIT Kanpur and SUNY Buffalo, Firodia Award, the Life-time Achievement Award of the Indian Science Congress and several Doctor of Science honoris causa, including from SUNY Buffalo, and Jadavpur University.

Ashutosh is an elected Fellow of The Indian National Science Academy, The Indian Academy of Sciences, The National Academy of Sciences, India and Indian National Academy of Engineering, The World Academy of Sciences (TWAS) and the Asia-Pacific Academy of Materials. He has also served on the Councils of the first two. He has been an associate editor of ACS Applied Materials and Interfaces, Proceedings of Indian National Science Academy and ASME Journal of Micro- and Nano-Manufacturing and has been on the editorial boards of several journals: Carbon; ACS Industrial and Engineering Chemistry Research; Current Science; Nanomaterials and Energy; Chemical Engineering Science; Journal of Colloid and Interface Science; Canadian Journal of Chemical Engineering and Indian Chemical Engineer.

Ashutosh's other interests are in ancient history and philosophy, poetry and art.



Bill Tam, COO and Co-Founder of The Digital Technology Supercluster

Bill Tam comes from a diverse professional background as a startup entrepreneur, marketing and business development executive, venture capitalist and a not-for-profit executive. He is passionate about technology and startups, and was formerly the CEO of the BC Tech Association's Centre4Growth. Bill holds a Bachelor of Engineering from McGill University, and an MBA from the University of Western Ontario.

KEYNOTE SPEAKER

REGENERATIVE AGRICULTURE



Karn Manhas, CEO and Co-Founder of Terramera

Terramera CEO and Founder **Karn Manhas** is an AgTech industry pioneer on a mission to transform how food is grown and the economics of agriculture. With Terramera's revolutionary Actigate™ platform and a powerful suite of machine learning tools, the company is tackling the audacious goal of reducing global synthetic pesticide loads 80% by 2030. Founded in 2010, Vancouver-based Terramera has earned international recognition for technologies that protect human health and the environment, ensuring an earth that thrives and provides for everyone.

With the success of their recent US\$50M (~C\$68M) Series B raise, Terramera is poised to scale globally, taking a collaborative approach by licensing Actigate to natural and conventional crop protection producers. Privately held, Terramera's international IP portfolio has grown to more than 240 patents (granted or pending). Using a game-changing technology that improves the performance of active ingredients by up to 10x, Actigate remedies the traditional "spray and pray" approach that washes 50-90% of applied farm chemicals into the environment. Leveraging a world-class bench of scientists, engineers and investors, Terramera's innovations dramatically reduce environmental impact, improve farm productivity and boost grower profitability.

Karn's diverse background spans being the youngest Member of the Legislative Assembly elected in British Columbia in 2001 to being a TEDx speaker and sought-after thought leader on sustainability, clean food and innovative organizations. He is a member of YPO and fellow at Unreasonable Group, and was named one of Business in Vancouver's top Forty Under 40 business people. Terramera's recent awards include Fast Company naming Actigate a 2020 "World-Changing Idea," winning the inaugural Nutrien-Radicle Challenge Canada and the C.L.I.C. Challenge – 1st Edition. Karn holds a Juris Doctor in Law from the University of British Columbia and a B.Sc. in Biology (Genetics) and Biotechnology from McGill University.

KEYNOTE SPEAKER

ZERO-BUDGET FARMING



Dr. Vijaykumar, Executive Vice – Chairman, Rythu sadhikara samstha (Ry.S.S), an Organization for empowerment of farmers, Govt of A.P. Leading the Andhra Pradesh Community-Managed Natural Farming

A Physics honour student and an MBA from Faculty of Management Studies, Delhi University (1977).

He joined the Government, in 1983, in the Indian Administrative Service. Allotted to Andhra Pradesh (A.P) cadre.

In his 37 years of Govt. service, he has spent about 25 years in large-scale community mobilization and promotion of livelihoods of rural women, tribal communities and farmers.

He spent a record 10 years, 2000 to 2010 as CEO of Society for elimination of Rural Poverty (S.E.R.P) in A.P and led the mobilizing and empowerment of 11.5 million rural poor women into thrift and credit based self-help groups (SHGs) and their federations, to enable them to pursue multiple livelihoods and come out of poverty.

From 2010 to 2015, was the first Mission Director of the National Rural Livelihoods Mission (N.R.L.M), Govt of India. He has taken the lessons of SERP to the whole country, with a vision of mobilising 100 million rural women into S.H.G s and federations.

He returned to Govt. of AP in April 2015 as Special Chief Secretary, Agriculture Dept. After his retirement in September 2016, he has been appointed as the Adviser to Govt, Agriculture Dept. For the past 5 years, he has been leading the climate resilient, A.P Community managed Natural Farming, also known as Zero budget Natural farming. The vision is to cover by 2027, all the 6 million farmers farm workers in the state and to make the whole state a climate resilient and natural farming state.

Renamed as Andhra Pradesh Community-Managed Natural Farming in 2020, he is currently, serving as Executive Vice-Chairman of the Ry.S.S.in the programme. In 2019-20, 700,000 farmers and farm workers in A.P were practising natural farming. This work builds on the large-scale mobilization of women in the State from the year 2000.

COMPANY PRESENTATIONS

ACCURATE SOIL MOISTURE DETECTION USING RADIO WAVES



Prof. Devendra Jalihal, Department of Electrical Engineer, IIT Madras

Devendra Jalihal obtained B.Tech. (Hons) from the IIT, Kharagpur in 1983, M. Eng. From Canada in 1988 and Ph.D from Duke University, USA, in 1992, all in Electrical Engineering. He has been with the Electrical Engineer Department, IIT Madras since 1994 where he is presently a professor.

His research interests include digital signal processing, wireless communication, real-time voice and video communication, and applications of wireless technologies to modern societies. He has worked in a number of areas from speech coding, robust video coding, digital modern design and MIMI wireless communication. He has worked on a number of projects such as low bit-rate video conferencing, tactical communication system, disaster management communication system and satellite communication network. His present interests include power efficient communication systems and efficient processing of Indian languages.



Mr. Sakthivelu, RF Wave Technologies Pvt. Ltd.

Shri. K. Sakthivelu completed his MS (By Research) at the Department of Electrical Engineering, IIT Madras. Currently he is the Chief Technology Officer of RF Wave Technologies Pvt Ltd, an IITM incubated company.

EARTH OBSERVATION FOR PRECISION AGRICULTURE



Chris Rampersad, Vice President of Engineering, UrtheCast

Chris Rampersad is the Vice President of Engineering at UrtheCast, a data services company specializing in satellite imaging and geo-analytics for agriculture and other verticals. Chris has worked in the space industry for 18 years in the area of Earth Observations satellites. Prior to UrtheCast he was a technical lead at MDA where he led and developed solutions for world class satellite missions including the RapidEye Constellation which was one of the first commercial constellations designed to support agriculture. Chris holds a Master of Science degree in Aerospace Engineering from the University of Toronto Institute for Aerospace

Studies and is an IEEE GRSS industry distinguished lecturer in the area of Earth Observation satellites.

INTELLIGENT SOIL MOISTURE PREDICTION AND IRRIGATION SYSTEMS



Prof. Arun K. Thangirala, Department of Chemical Engineering, IIT Madras

Dr. Arun K. Thangirala obtained his Bachelors degree in Chemical Engineering from IIT Madras in 1996 and his Doctoral degree in Process Control & Monitoring from the Department of Chemical & Materials Engineering, University of Alberta, Edmonton, Canada in the year 2001. Continuing as a Post-Doctoral Fellow for a short period, he joined as a Research Manager in the Industry-Govt. sponsored Chair Program at the same department. He was in charge of this position until Dec. 2004.

In Dec. 2004, Dr. Thangirala returned to his alma mater (IIT-M) as a Visiting Faculty in the Department of Chemical Engineering. He is presently serving as a Professor in the Department of Chemical Engineering, IIT Madras.

Dr. Thangirala is a recipient of prestigious teaching & research awards and international fellowships. In addition, he has held the positions of Visiting Professorship at leading international universities such as *University of Delaware*, *Technical University of Munich*, *Tsinghua University*, etc. He was awarded the Young Faculty Recognition Award in 2010 and the Institute Research and Development Award (Junior Level) in 2014 by IIT Madras.

He has recently authored a comprehensive classroom text on System Identification under the title "***Principles of System Identification: Theory and Practice***", published by CRC Press. The book has been designed as a one-stop resource for linear system identification and can also be used in introductory courses on random signal processing and parameter estimation.

USING PROXIMAL AND REMOTE SENSING TECHNOLOGIES TO SUPPORT REGENERATIVE AGRICULTURE



Prof. Sean Smukler, University of British Columbia

Sean Smukler is the Chair of Agriculture and the Environment, an Associate Professor, and Associate Dean of Graduate and Postgraduate Studies for the Faculty of Land and Food Systems at the University of British Columbia. His research currently focuses on helping farmers adapt to climate change and improve the sustainability of their farming practices specifically as they relate to soils. Sean received a PhD in Ecology from the University of California, Davis where he also did his undergraduate studies. He holds a MSc. in Forest Soils from the University of Washington, Seattle.

SUSTAINABILITY THROUGH DIGITAL AGRICULTURE



Bruce Ringrose, Head of Sustainability and Stakeholder Relations, Farmers Edge Inc.

A strategy and business development leader with more than 20 years' experience in economic and environmental initiatives, Bruce Ringrose advances the strategic plans and spearheads partnership development that have solidified Farmers Edge as a global leader in sustainable agriculture risk management solutions.

An experienced entrepreneur, Bruce has co-founded several consulting companies – primarily focused on forging partnerships among businesses focused on accelerating innovation with economic and environmental objectives. Prior to this, Bruce was a pioneer in clean tech investment for the Government of Canada managing a portfolio of technology demonstration projects worth in excess of \$250M.

Bruce obtained his B.Sc. with Honors from Trent University with a double major in Environmental and Resource Science and Physical Geography. Bruce resides in Metcalfe, Ontario Canada.