

CV
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Dr. Rajendra Singh received the B.Sc. degree from Agra University, Agra, India, in 1965, the M.Sc. degree in physics (electronics as the special subject) from Meerut University, India, in 1968. Born in rural India, he had no exposure of electrical power before he was 12 years old. As a result, he was driven by the need to develop sustainable ultra-low cost clean source of electrical power for underprivileged people not only living in India but all over the world. During oil embargo of 1973, he decided to do his PhD dissertation in the area of Silicon solar Cells. He received his Ph.D. Degree in physics from McMaster University, Hamilton, Ont., Canada, in 1979.

From May 1979 to August 1979, he was a Visiting Assistant Professor at the University of Waterloo, Canada. From 1979 to 1980, he was a Visiting Assistant Professor in the Department of electrical Engineering at Colorado State University, Fort Collins. In 1980, he joined Energy Conversion Devices, Inc., Troy, MI, as Senior Research Scientist and worked on developing low-cost solar cells. Part of the work done at Energy Conversion Devices resulted in one U.S. and four foreign patents. In August 1982, he joined the University of Oklahoma, Norman, as Associate Professor in the School of Electrical Engineering and Computer Science. In 1986, he was promoted to Professor, and in 1987, he became Director of the Microelectronics Laboratory. In January 1991, he joined Clemson University as the first D. Houser Banks Professor in the Department of Electrical and Computer Engineering. From 1996 to 1999, he served as the Director of the Materials Science and engineering Program at Clemson University. On November 1, 1997, he became the Director of the Center for Silicon Nanoelectronics at Clemson University. During his career he has mentored a number of undergraduate and graduate students and professionals in academia and industry. Several of his ex-students are playing leadership role in shaping the future of the 21st century.

With proven success in operations, project/program leadership, R&D, product/process commercialization, and start-ups, Dr. Singh is a leading photovoltaic (PV) and semiconductor manufacturing expert with industrial and academic experience. During the last 40 years, Dr. Singh has played the role of visionary leader to advance the technology of photovoltaic (PV)

generated electrical power. Based on economic considerations, in 1980 he predicted silicon as the dominant PV material. To transform global electricity infrastructure, he is providing global leadership to use PV as the source of local direct current electricity in U.S., emerging and underdeveloped economies (<http://spectrum.ieee.org/green-tech/buildings/dc-microgrids-and-the-virtues-of-local-electricity>). The nominee has championed Photovoltaics (PV) as a sustainable green electricity generation technology for sustainable global economic growth. For more than 1.5 Billion people without any excess to electricity, he has proposed the use of local direct current (DC) in place of alternating current (AC) power, ultra large scale manufacturing of PV modules and batteries, and vertically integrated business model to provide ultra-low-cost electricity generated by PV (<http://spie.org/x108820.xml>). In 2014, he predicted that by the year 2024, the cost of PV electricity generation with storage will be \$0.02/kWH (<http://www.doiserbia.nb.rs/img/doi/0353-3670/2014/0353-36701402275S.pdf>). Today without storage in many parts of the world, the cost of PV electricity is at \$0.04/kWH.

The technology invented by Dr. Singh at Energy Conversion Devices (US Patent No. 4419533. South African Patent No. 830748; Great Britain Patent No. 2116364) is used in the manufacturing of amorphous thin film PV modules sold by United Solar. During the last three decades, Dr. Singh has made sustained seminal contributions and played a visionary leadership role in developing the engineering science and technology of fast manufacturing of solar cells. The technique is called rapid thermal processing (RTP). The technology invented by Dr. Singh (US Patents #.5, 820, 942, 1998 & # 5, 980, 637, 1999) has been licensed to RTP tool manufacturer AG Associates (prototype tool developed in his Lab). Several companies are selling fast processing furnaces for manufacturing solar cells. As an example, Radiant Technology Corporation is selling furnaces where UV and infra-red heating is used in place of conventional infrared heating. He is also inventor of a pending patent "System and Method for Planning the Establishment of a Manufacturing Business".

Since starting as a PhD student, Dr. Singh has been a champion of photovoltaics thought his life. As a leading PV technologist, the nominee has been key note speaker of many international conferences organized by leading professional societies in various parts of the world (India, Serbia, Romania, Mexico, Columbia, Peru, Argentina, Bangladesh, France, Japan, Canada, and US etc.). In 1987, as Distinguished Technologist under United Nations Development Program - Transfer of Knowledge through Expatriate National (TOKTEN), he lectured at many national Labs and universities in India. As a speaker, he visits India frequently. On December 16, 2012, he delivered key note address, "Green Energy Conversion & Storage for Solving India's Energy Problem through Innovation in Ultra Large Scale Manufacturing and Advanced Research of Solid State Devices and Systems", in International Conference on Emerging Electronics ICEE 2012, which was held at IIT Bombay. In this talk Dr. Singh advocated that with major innovations in energy policy, large scale manufacturing of PV modules and related systems in India, and the use of a vertically integrated business model, PV electricity can be generated at the cost of Rupees 5/kWh in India. In addition there are novel applications of PV in transport sector and water lifting for irrigation and drinking. http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=6636220&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxppls%2Fabs_all.jsp%3Farnumber%3D6636220 During his most recent visit he delivered

keynote address”, Photovoltaics, battery and internet of things manufacturing for transformation of global electricity and transport infrastructure”, on March 3rd 2016 in the 3rd IEEE International conference on Devices, Circuits and Systems ICDCS 2016, held at Coimbatore.

He is author or co-author of over 400 publications in various journals and conference proceedings. He is editor or coeditor of more than fifteen conference proceedings. He has presented over 50 keynote addresses and invited talks in various national and international conferences. He has served on a number of committees of various professional societies. Currently he is serving as Editor of IEEE Journal of Electron Devices Society He serves as editorial board member of four journals.

Under Solar Energy and Climate Change, United Nations has listed Dr. Singh’s publications as the publications for learning more about Solar Energy

<http://www.light2015.org/Home/WhyLightMatters/Energy.html>

He is the author of forthcoming book, “Eradication of Global Terrorism and Energy Poverty by Photovoltaics Generated Local Direct Current Power “. With ultra-low-cost manufacturing of photovoltaic system and batteries, the projected global electrical power infrastructure and electrical power dominated surface transport will provide solution to the problems of climate change, terrorism, energy poverty and sustained global economic growth. Main theme of this book is summarized in his key note address , ” Photovoltaics (PV) Generated Local Direct Current Power: Eradication of Global Energy Poverty and Poverty in Five Years’, which he delivered in UNESCO sponsored Africa Regional Conference and Exhibition on Light and Light-based Technologies held in Accra, Ghana on September 14, 2015. The lecture is available on you Tube https://www.youtube.com/watch?v=sYqcONm_bZc&feature=youtu.be

He is fellow of the Institute of Electrical and Electronics Engineers , the Society of Optical Engineering, American Association for the Advancement of Science, , and American Society of Metals, ASM. He has received a number of national and international awards for his contributions to the development of photovoltaics technology. He has received seven awards for teaching and research from the University of Oklahoma, IEEE distinguished Lecturer for Latin American (1983) , Distinguished Technologist United Nations Development Program (1987), IEEE Electron Device Society distinguished Lecturer (1994-1998), and outstanding Researcher Award, Clemson University Sigma Xi Chapter Award (1997), four Clemson University awards for Faculty Excellence, Thomas D. Callinan Award of the Electrochemical Society (1998), J.F. Gibbons Award from the 11th IEEE International Conference on Advanced Thermal Processing of Semiconductors (2003), and the McMaster University Distinguished Alumni Award. In 2010 Photovoltaics World selected him as one of ten global Champions of Photovoltaic Technology (http://www.renewableenergyworld.com/rea/news/article/2010/10/champions-of_photovoltaic)

He is the recipient of the 2014 Society of Optical Engineering (SPIE) Technology Achievement Award.(<http://spie.org/Documents/AboutSPIE/2014-Awards/Technology-Achievement-2014.pdf>). In April 2014, he was honored by US President Barack Obama as a White House

“Champion of Change for Solar Deployment” for his leadership in advancing solar energy with PV technology (<http://www.whitehouse.gov/champions/solar-deployment/rajendra-singh>).