
Dr. Haruhiko Okumura



Title: How to make innovations!

- Lessons learned by several display innovations -

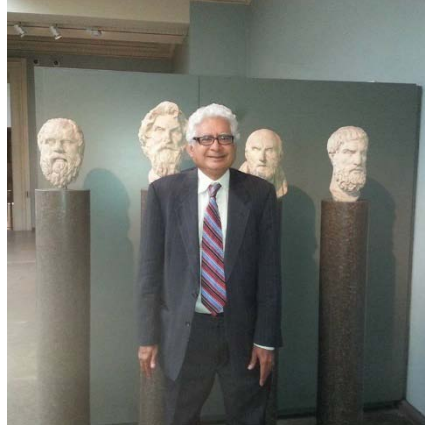
Abstract: Revolutionary innovations (also called discontinuous innovations) which are often disruptive and new is a synonym for a risk-taking. Organizations that create revolutionary products or technologies take on the greatest risk because they create new markets. We cannot predict revolutionary innovation, which also makes very difficult to start researching such kinds of disruptive technologies. I would like to introduce some revolutionary innovative display technologies based on my experience to give you some hints to start them as the researchers which challenge the common sense.

At first, I mainly focus on LCD technologies to create and open a new flat panel TV market. In 1990, it was said that the motion blur problem for LCD TVs was impossible to be solved without ultra-fast response materials. However, we discovered that the motion blur was caused not by the binary response as a common-sense would suggest at that time. Rather it is due to both - drastically degraded gray-level response (brightness in the middle between 0% black and 100% white), and the decrease in the driving voltage because of the electrostatic capacity change according to the rotation of the liquid crystal molecules. Based on the novel image-lag mechanism, we invented the overdrive method that is a liquid crystal driving method to emphasize the applied voltage to the liquid crystal only for a certain period according to the change in the pictures (brightness) so that it may compensate for the liquid crystal response deterioration. After that, it took more than 13 years to put it on the market. I also would like to tell you about why so much time was required to make the revolutionary innovation.

In addition, like other innovative technologies, I would like to introduce an LCD device technology, 3D display, and plasma display technology, especially focusing on innovative idea and concept prototyping stage.

Bio: Haruhiko Okumura received B.Sc., M.Sc. and Ph.D. degrees in Electrical Engineering from Waseda University in 1981, 1983 and 1995, respectively. He joined Toshiba R&D Center, Kawasaki, Japan, in 1983. He has been engaged in developing image-pickup equipment and video coding technologies for TV telephone and convention equipment. He is now working on research and development of image processing and driving technologies for flat panel displays, especially LCDs and new display applications such as AR, VR and Head-Up Display (HUD). He has been an IEEE CE society East Joint Japan Chapter Chair since 2014.

Dr Sreeram Dhurjaty



Title: Application of Consumer Electronics in Medical devices

Abstract: Consumer devices are becoming smarter and more affordable, Mobile Technology has already become ubiquitous and has enabled new applications in health care, including, personalized and wearable devices. These devices and new sensors will enable personalized health care at home. Advances in 3-D printing will allow the printing of prosthesis and orthotics at remote locations. Rapid communication via the networks will enable globalization of diagnostics and therapy. Routine physician visits may become unnecessary due to tele-consultation. Tele-therapy, such as passive and active telerehabilitation will find its way into homes. Personalized robotic helpers will aid the disabled and elderly. These advances are only possible with affordable consumer devices with practically unlimited processing power available with modern consumer technologies such as smartphones and video-gaming systems. Furthermore, re-purposing of components that are being used in Microwave ovens are allowing devices such as hand-cranked affordable defibrillators, that can deliver therapy to low and middle income countries where reliable power is unavailable.

Bio: Employment

2006- Present President, Dhurjaty Electronics Consulting LLC, Rochester, NY

2007-2016 Visiting Senior Research Associate, Dept. of Physics and Astronomy, University of Rochester, Rochester, NY

1987- 2007 Technology Guru, Senior Fellow Health Imaging Systems, Research labs, Eastman Kodak Company, Rochester, NY

1981 – 1987 Principal Engineer, Medical Instrumentation, Analogic Corporation, Peabody, MA

1979 - 1981 Staff Engineer, Becton Dickinson Medical Systems, Sharon, MA

Achievements:

- Inventor of the World's first Hand cranked defibrillator, to be commercialized in, India

- Architect and Senior R&D manager of a wireless film-cassette sized Digital radiography System for the Kodak health group (now Carestream) which became a \$1500 million/year business in 2015 for Carestream. Supervised 22 including group leaders, engineers and technicians. Took product from concept to manufacture
- Engineering manager/Principal engineer of a Computed radiography system, at Kodak that became a \$400 million/year business.
- Did research on Ghosting mitigation on Amorphous Selenium panels. Designed HV power supplies for experimentation.
- Led the Electronics/Electrical team for a Radiographic laser printer at Kodak which was a \$500 million business in the 90's.
- Started an initiative in Tele-rehabilitation for a new business group which had a potential of \$80 million/year
- Architect and manager of a cardiology program to store cardiac images on CDs and initiated the DICOM working group for cardiology. This was a \$30 million program.
- Key member of the Engineering process improvement team which was initiated by the CEO of Kodak in 1993
- Principal investigator on a NIST program with Carnegie Mellon University to increase packing densities on 14 inch
- Optical disks to 1 TB
- Architect and Engineering manager for Analogic's first fetal heart monitor which grew to be a \$100/million year business in the 80s. Supervised 40 engineers and technicians.
- Architect for a Phased array ultrasound system, a \$37 million/year business and managed 12 engineers
- Designed CT scanner front ends and data path electronics.
- Designed an electro surgical generator for an OEM customer with a team of 4 Engineers and technicians
- Designed a Pulse Height Analyzer for Nuclear medicine which was first used in "201 Thallium" imaging
- Wrote algorithms for CT scanner reconstructions
- Designed High Efficiency power supplies for Patient Monitors and CT scanners
- Designed and deployed Resonant Electrical Impedance Spectroscopy system for Breast and Thyroid Systems for the University of Pittsburgh and University of Oklahoma
- Consultant for new Patient monitoring architectures.
- Designed single-use ECG amplifier for a west coast firm (Won first place in the medical devices annual award, 2003)
- Designed implantable on-demand pacemaker and ICD charge/discharge circuits, for a major manufacturer
- Designed and developed circuitry for an Automatic Electrical Defibrillator for a major manufacturer of defibrillators.
- Designed front-end electronics for a Phased array ultrasound system, for a major manufacturer.
- Complete systems architecture for Color flow Doppler system for a major manufacturer
- Developed a 19.2KiloBaud Power-line modem system for a large shipping company
- Developed a 24-bit Data acquisition system for a Seismic company.
- Developed flow-measurement instrumentation for measuring high-speed turbulence in wind-tunnels.
- High Efficiency Power Supplies for Medical Systems
- Displays and sensors for medical devices
- Designed Novel Front-end for a Computed Radiography system
- Designed HV power supplies for CT scanners and Dental Radiography.

- Architected a power supply and battery charging circuit for a portable clinical chemistry monitoring system
- Participated in depositions for Eastman Kodak's patent portfolio

Professional memberships and Other Experience

Life Senior Member, IEEE, Emeritus Member AAPM, SPIE, AAMI
 Section Chair IEEE, Rochester, NY
 Professional member, American Heart Association
 Past Member, IEEE committee on man and Radiation
 Past Chairman, IEEE EMBS, Boston Chapter
 Founding member and Chairman, IEEE, Society for Social Implications of Technology, Boston Chapter
 Former Member of board, Greenleaf Medical Systems, Palo Alto, CA
 Past Member Advisory Board, Rehabilitation Research Center, National Rehabilitation Hospital, Washington DC
 Member, AAMI ECG Committee
 Member AAMI Defibrillator Committee.
 Member of the BOD for Engineering World Health

Honors

Mees Award, (1997) Eastman Kodak Company, for excellence in technical reporting
 Life Senior Member, IEEE

Patents

Sixteen patents in the areas of Laser modulation, Hardcopy devices, Digital and Computed radiography and defibrillators ([5,081,631](#), [5,260,561](#), [5,260,955](#), [5,323,018](#), [5,764,664](#), [6,031,583](#), [6,219,083](#), [6,597,949](#), [7,211,802](#), [7,211,803](#), [7,453,983](#), [7,456,409](#), [7,495,226](#), [7,989,773](#), US20150212027

Prof. Dr. Roberto Minerva



Title: Digital Twin as an enabler for Servitization

Abstract: Digital Twin is an original attempt from the manufacturing industry to design, develop, test and operate artifacts exploiting software capabilities. In such way it is possible to create a virtual object capable of fully represent the actual product. This concept has been very influential for the current developments of the Internet of Things. However, its definition has

been, at least intuitively, extended over the years by inheriting concepts, ideas and solutions from other technical trends that were aiming at creating and leveraging a stronger link between reality and the software representation and manipulation of it. The talk discusses what an enhanced Digital Twin is by analyzing the original concepts as well as relevant contribution stemming from Multi Agent Systems, Virtual and Augmented Reality Systems and the rising Virtualization and Software defined network trend. The talk provides an extended view (a definition) of the Digital Twin concept, it describes some application scenario examples and discusses the applicability and the possible evolution of this promising approach with respect to new business opportunities like Servitization.

Bio: Roberto holds a Ph.D in Computer Science and Telecommunications from Telecom Sud Paris, France, and a Master Degree in Computer Science from Bari University, Italy. He is Maitre de Conference (associated Professor) at Institut Mine-Telecom, Telecom Sud Paris. His research topics are: edge computing and 5G, virtualization and SDN, Internet of Things and Artificial Intelligence and Machine Learning. He was the Chairman of the IEEE IoT Initiative, an effort to nurture a technical community and to foster research in IoT. Roberto has been for several years in TIMLab, involved in activities on SDN/NFV, 5G, Big Data, architectures for IoT. He is authors of several papers published in international conferences, books and magazines.

Prof. Dr. Muhammad Khurram Khan



Title: Communal Acts of IoT Consumers: A Potential Threat to Security & Privacy

Abstract: Consumer Electronics IoT (CEIoT) products, implemented with improper security measures and inadequate privacy-preserving mechanisms, let the hackers or intruders to access and misuse consumer's personal information. In this talk, we will present a framework and perspective to study and address IoT consumer's security and privacy violation from seemingly five different angles; borrow, rent, gift, resale, and retire. In the act of borrow, an IoT consumer takes and uses another consumer's CEIoT products with the intention of return after usage. In the act of rent, a consumer offers his CEIoT products to other people for temporary usage and charges regular payment for the service. In the act of gift, a consumer willingly gives or presents his used CEIoT products to his friends or relatives without payment. In the act of resale, IoT consumers sell their previously bought or used CEIoT products. In the act of retire,

IoT consumers dispose of or throw their used CEIoT products when they become out of service or after the end of product's life. This act could raise serious privacy concerns, since "IoT waste" may become an attractive gateway for cybercriminals to access private information. Moreover, we will also present challenges with the above-mentioned five acts of security and privacy violation. And finally, we will suggest some recommendations and future directions to preserve the security and privacy of IoT consumers.

Bio: Prof. Khurram is the Editor-in-Chief of a well-reputed International journal 'Telecommunication Systems' published by Springer for over 25 years with its recent impact factor of 1.542 (JCR 2017). Furthermore, he is the editor of several international journals, including, IEEE Communications Surveys & Tutorials, IEEE Communications Magazine, IEEE Internet of Things Journal, IEEE Transactions on Consumer Electronics, Journal of Network & Computer Applications (Elsevier), IEEE Access, IEEE Consumer Electronics Magazine, PLOS ONE, Electronic Commerce Research (Springer), IET Wireless Sensor Systems, Journal of Information Hiding and Multimedia Signal Processing (JIHMSP), and International Journal of Biometrics (Inderscience), etc. He has also played role of the guest editor of several international journals of IEEE, Springer, Wiley, Elsevier Science, and Hindawi, etc. Moreover, he is one of the organizing chairs of more than 5 dozen international conferences and member of technical committees of more than 10 dozen international conferences. In addition, he is an active reviewer of many international journals as well as research foundations of Switzerland, Italy, Saudi Arabia and Czech Republic. Prof. Khurram is an honorary Professor at IIIRC, Shenzhen Graduate School, China and an adjunct professor at Fujian University of Technology, China. He has secured an outstanding leadership award at IEEE international conference on Networks and Systems Security 2009, Australia. He has been included in the Marquis Who's Who in the World 2010 edition. Besides, he has received certificate of appreciation for outstanding contributions in 'Biometrics & Information Security Research' at AIT international Conference, June 2010 at Japan. He has been awarded a Gold Medal for the 'Best Invention & Innovation Award' at 10th Malaysian Technology Expo 2011, Malaysia. Moreover, in April 2013, his invention has got a Bronze Medal at '41st International Exhibition of Inventions' at Geneva, Switzerland. In addition, he was awarded best paper award from the Journal of Network & Computer Applications (Elsevier) in Dec. 2015.

Prof. Khurram is the recipient of King Saud University Award for Scientific Excellence (Research Productivity) in May 2015. He is also a recipient of King Saud University Award for Scientific Excellence (Inventions, Innovations, and Technology Licensing) in May 2016. He has published more than 325 papers in the journals and conferences of international repute. In addition, he is an inventor of 10 US/PCT patents. He has edited 7 books/proceedings published by Springer-Verlag and IEEE. He has secured several national and international competitive research grants with an amount of over USD 2 Million in the domain of Cybersecurity. Prof. Khurram has played a leading role in developing 'BS Cybersecurity Degree Program' and 'Higher Diploma in Cybersecurity' at King Saud University. His research areas of interest are Cybersecurity, digital authentication, biometrics, multimedia security, IoT security, cloud computing security, and technological innovation management.

He is a fellow of the IET (UK), fellow of the BCS (UK), fellow of the FTRA (Korea), senior member of the IEEE (USA), senior member of the IACSIT (Singapore), member of the IEEE

Consumer Electronics Society, member of the IEEE Communications Society, member of the IEEE Technical Committee on Security & Privacy, member of the IEEE IoT Community, member of the IEEE Smart Cities Community, and member of the IEEE Cybersecurity Community. He is also the Vice Chair of IEEE Communications Society Saudi Chapter. His more detailed profile can be visited at <http://www.professorkhurram.com>.