Venkat Selvamanickam

Education

University of Houston	Materials Eng.	Ph.D. (1992)
University of Houston	Mechanical Eng.	M.S. (1988)
Regional Eng. College (now NIT), Tiruchi	Mechanical Eng.	B.E. (Honors) (1986)

Professional Experience

UNIVERSITY OF HOUSTON

M.D. Anderson Chair Professor of Mechanical Engineering	9/2008 onwards
Professor of Physics	9/2010 onwards
Director, Applied Research Hub, Texas Center for Superconductivity	02/2010 onwards

PHILIPS ELECTRONICS (formerly Intermagnetics)

Vice President & Chief Technology Officer of SuperPower	(5/94 – 8/08)
Chief Technology Advisor of SuperPower	9/2008 onwards

OAK RIDGE NATIONAL LABORATORY (5/93 - 5/94)
Research Associate

TEXAS CENTER FOR SUPERCONDUCTIVITY
Post-doctoral fellow (9/92 - 4/93)

Research Highlights

- Developed technologies to fabricate single-crystalline-like films on flexible, polycrystalline substrates over length scales of more than a kilometer.
- Developed a unique Metal Organic Chemical Vapor Deposition (MOCVD) process and equipment to control vapor phase reaction, phase equilibria, and growth kinetics to achieve superior electrical performance including world-records for the highest critical current at several length scales as well as the fastest superconductor deposition process
- Developed thin film processing techniques for hetero-epitaxial growth of complex oxide materials such as perovskites, fluorites, bixbyites, pyrochlores, and rock-salts, by Ion Beam Sputtering, Magnetron Sputtering, E-beam Evaporation, and Metal Organic Chemical Vapor Deposition.
- Engineered nano-defects (1 to 10 nm) into thin film structure to enhance the magnetic properties of HTS tape and achieved world records of highest magnetic field generated at 77 K by any superconductor.
- Developed single crystalline-like germanium films for the first time on polycrystalline metal substrates and quartz substrates. This achievement has major benefit for low cost, high efficiency photovoltaics. III-V materials (GaAs) have been already successfully grown on these substrates with good photoluminescence. These templates can be used for other applications including solid state lighting and themoelectric waste heat recovery.
- Conceived and demonstrated a novel crystal growth technique to produce large single-crystalline REBaCuO with a world-record critical current performance in bulk ceramics.

Management Highlights

- Currently at UH, managing seven externally-funded program on superconductors, photovoltaics, and thermoelectrics sponsored by four companies, DOE, NSF, and the state of Texas.
- Director of the Applied Research Hub of the Texas Center for Superconductivity at the University of Houston (TCSUH), established through a $ 3.5 M program from the Emerging Technology Fund (ETF) from the state of Texas.
- Currently at UH, managing a group of 24 members (14 graduate students, one Research Professor, six scientists, one researcher, one engineer, and one undergraduate student)
- Created and led SuperPower's second-generation High Temperature Superconductor (HTS) program from 1995 onwards. Built and managed a team of 40+ high-performance personnel and led company to multiple word firsts and world records in thin film HTS tape.
- Led the completion of the world's first significant delivery (10,000 m) of thin film HTS tape to build a 30 m cable for the DOE Flagship program of Albany Cable Project, which is the world's first demonstration of a thin film superconducting cable in the electric power grid.
- At SuperPower, managed an $ 11 M/year budget ($ 8.5 M for R&D and $ 2.5 M for Capital Equipment). Managed five externally funded programs with DOE, Air Force Research Laboratory, AFOSR, Title III Office at an annual funding level of $ 5.5 M.
- At SuperPower, established and managed Cooperative Research Agreements at an annual budget of $ 3 M with Los Alamos National Laboratory, Oak Ridge National Laboratory, Argonne National Laboratory, and National Renewable Energy Laboratory and collaborations with Naval Research Laboratory, Air Force Research Laboratory, NIST, and Brookhaven National Laboratory.
- Created and managed technology roadmap for SuperPower and managed intellectual property portfolio of the company.

Publication & Patents

- Published more than 160 papers in several major journals and book chapters
- Authored the most cited paper in superconductivity and the third-most cited in Physics during March-April 1990 ; more than 560 citations to date.
- 42 issued patents, 11 pending U.S. patents and 74 pending international patents
- Editor of a book on "Flux Pinning and ac Losses"

Awards & Recognition

- Received the *Presidential Early Career Achievement (PECASE) Award* in 1996. This award is the highest honor bestowed by the U.S. Government on outstanding scientists and engineers beginning their independent careers. *Only-ever award recipient outside academia or research laboratories.* Received a grant of $500,000 for 5 years to conduct research on High Temperature Superconductivity in collaboration with the U.S. Air Force.

- Named as *Superconductor Industry Person of Year* for 2004 by Superconductor Week. This award is given for achievement in science & technology, advocacy in institutions, government, or industry, leadership/vision that assisted others in the advancement of the technology, and promotion of the technology.
- R&D 100 awards in 2007 and 2010 and two Federal Laboratory Consortium (FLC) awards in 2008 with Los Alamos and Oak Ridge National Laboratories
- Named as one of New York Capital Region's top forty business leaders under the age of forty in 2004 by the Business Review magazine (in a competitive selection process)
- Wire and Cable Technology International Award in 2009 for the development and transition to manufacturing of second-generation HTS wire technology
- Led organization to a ranking of #1 or #2 for eight years since 2002 among all technology developers in the U.S. by an independent Peer review panel under the auspices of the U.S. DOE Office of Electricity Delivery. #1 ranking in most recent Peer reviews (2010 and 2009) among 14 contenders.

Sponsored Research Programs at University of Houston (since Sep. 2008)

- Acquired $ 1.8 M program on second-generation High Temperature Superconductors, funded equally by SuperPower and the U.S. Department of Energy. Additionally, acquired from SuperPower state-of-the-art equipment fully installed (over $ 5 M), full-time services of five senior scientists, $ 8.8 M cost share for Emerging Technology Fund.
- Awarded as a co-PI a $ 3.5 M program from the Emerging Technology Fund (ETF) from the state of Texas for Research Superiority status centered on my presence at the University.
- Participant in $ 20.2 M DOE Smart Grid program (50% funded by DOE) on Fault Current Limiting Superconducting Transformer in collaboration with Waukesha Electric Systems, SuperPower, Southern California Edison, and Oak Ridge National Laboratory.
- Participating in $ 4.2 M ARPA-E program on Superconducting Magnetic Energy Storage system especially for renewable energy in collaboration with ABB, SuperPower, and Brookhaven National Laboratory.
- Established a sponsored research program with Bruker, one of the world's largest manufacturers of Nuclear Magnetic Resonance Spectroscopy (NMR) equipment.
- Created a new program in the College of Engineering on thermoelectric materials and also began collaboration with Hi-Z Technology, a company developing thermoelectrics. This program is funded by NSF-STTR.
- Created a new program in the College of Engineering on Photovoltaics in collaboration with the Center for Advanced Materials at the University of Houston. Program funded by DOE-EERE office and NSF-STTR, the latter in collaboration with Ampulse, a company developing thin film photovoltaics.
- NSF funded program on "Epitaxial Growth of Superconducting Films on Templates with Prefabricated Nanowires"

Professional Services

- Member of Organizing Committee of the Materials Research Society Spring Meeting Symposium, San Francisco, 2010, Materials Research Society International Workshop on HTS, Gatlinburg, 2002, Materials Science & Technology (MS&T) Conference, Houston 2010, Cincinatti, 2006, Applied Superconductivity Conference, Houston, 2002, ISTEC-MRS International Workshop on HTS, Honolulu, 2001, U.S. Department of Energy Wire Development Workshops, St. Petersbsurg, 2000 – 2007, U.S. Department of Energy Cable Workshop, Houston, 2010.
- Member of International Advisory Committee of European Applied Superconductivity Conference (EUCAS), Leiden, 2011, International workshop on Coated Conductor for Applications, Tsukuba 2010, Barcelona, 2009, Houston 2008, Dresden, Germany, 2006, Orta S. Giulio, Italy, 2003.
- Mentored Burnt Hills High School student Olivia Partyka for 2 years enabling her to become a finalist in the nationally renowned Intel Science & Technology Competition.
- One of nine international panelists to choose the 2005 & 2006 Superconductivity Industry Person of the year

Academic Services

- Director of the Applied Research Hub of the Texas Center for Superconductivity at the University of Houston (TCSUH)
- Member of College of Engineering Promotion and Tenure Committee
- Member of the College of Engineering Research awards selection committee
- Member of TCSUH Executive Committee
- Chair of one of four subcommittees in the University's Renewable Energy Technical Advisory Committee
- Member of TCSUH Research Committee
- Chair of search committees for two faculty positions sponsored by Emerging Technology Fund, member of search committees for VP of Research and for Chair of Mechanical Engineering