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 (joint appointment)	9/2010 onwards
Professor of Chemical Engineering (joint appointment)	9/2012 onwards
Professor of Materials Eng. (joint appointment)	9/2012 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 – 08/2012

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, growth kinetics, stability 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, high mobility germanium films for the first time on polycrystalline metal substrates and quartz substrates. This achievement has major benefit for low cost, high efficiency photovoltaics and flexible electronics. III-V materials (GaAs) have been already successfully grown on these substrates with good photoluminescence and high mobility. 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 nine externally-funded programs on superconductors, photovoltaics, and thermoelectrics sponsored by two companies, ARPA-E, DOE-EERE, NSF, and the state of Texas. Research expenditures of $ 2.3 M in CY 2012, $ 3.1 M in CY 2011, over $1.8 M in CY 2010 and over $ 950 K in CY 2009.
- 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 (11 Graduate Students, two Research Faculty, five Research Scientists, one post-doc, three Engineers, one Safety Manager and one Facility/Business Director)
- Graduated ten M.S. students during Sep. 2008 – Aug. 2013. Group presently consists of eight Ph.D. students and three M.S. students. **30 papers published during Sep. 2008 – Aug. 2013 with student co-authors.**
- Establishing a state-of-the-art Energy Device Fabrication Laboratory in Energy Research Park with $ 5M funding.
- Brought in four scientists, one equipment engineer and power systems engineer as research faculty on SuperPower payroll to support UH research and mentor students.
- 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 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 194 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.
- 53 issued patents, 13 pending U.S. patents and over 80 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, 2010 and 2012 with Oak Ridge National Laboratory
- 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.
- Senior Researcher Award in College of Engineering, 2012
- Entrepreneur/Innovation Award of the Cullen College of Engineering, University of Houston in 2013. This award recognizes alumni who have accepted a high level of risk to pursue an opportunity in an enterprise or venture to introduce new technologies into the workplace that increased efficiency and productivity in the generation of new products.
- Chosen by Houston Chronicle as one of "11 of the greater Houston area's top scientific minds" to author articles on 11 promising technologies for the coming years

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

- Awarded $ 4 M funding from ARPA-E in Rare-Earth Critical Technologies program. Program duration Jan. 2012 – Dec. 2014.
- Acquired $ 2.3 M program on second-generation High Temperature Superconductors, funded by SuperPower and the U.S. Department of Energy. Additionally, acquired from SuperPower state-of-the-art equipment fully installed (over $ 6 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 SPX, 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.
- Participating in $ 4 M Army Research Laboratory-funded program on Superconducting Magnetic Energy Storage system DOD microgrids with SuperPower, and Brookhaven National Laboratory and MTech Laboratories.
- Participating in $ 2.1 M ARPA-E program on Superconducting Magnetic Energy Storage Cable with Tai-Yang Research and North Carolina State University.
- 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"
- Acquired from Los Alamos National Lab equipment worth $ 250,000.

Professional Services

- Associate Editor of IEEE Transactions of Applied Superconductivity
- 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, Heidelberg 2012, 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.
- Participated in DOE road map development for $1/W photovoltaics with 50 scientists and engineers invited by DOE Secretary Chu.
- One of four panel members of Energy Braintrust forum at the 40th Annual Congressional Black Caucus Legislative Conference, Washington D.C., Sep. 2010. Other panel

members included Dr. Kristina Johnson, Under Secretary of Energy, Department of Energy and Admiral Thad Allen, National Incident Commander for Deepwater Horizon

- Panel and Ad-hoc Reviewer for NSF proposals

Academic Services

- Director of the Applied Research Hub of the Texas Center for Superconductivity at the University of Houston (TCSUH). 2010-present
- Member of College of Engineering Promotion and Tenure Committee , 2009-2013
- Member of the College of Engineering Research awards selection committee, 2009-2011.
- Member of TCSUH Executive Committee, 2009-present.
- Member of College Technology Transfer Committee, 2011
- Member of College of Engineering Dean's Faculty Advisory Committee, 2011- present
- Chair of one of four subcommittees in the University's Renewable Energy Technical Advisory Committee (2010)
- Member of TCSUH Research Committee, 2009-present
- Chair of search committees for four faculty positions in Mechanical Engineering, 2010-present
- Member of search committees for VP of Research (2011) and for Chair of Mechanical Engineering (2010-2011)