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EDUCATION:

MBA	The Fuqua School of Business, Duke University, Durham, NC.
HSM Cert.	Duke Health Sector Management Certificate, Duke University, Durham, NC.
ME	Spl. in Manuf. Syst. Engg., University of Virginia, Charlottesville, VA.
Ph.D.	Indian Institute of Science, Bangalore, India.

PROVEN AREAS OF EXPERTISE INCLUDE:

- Reduced Risk Product Strategies
- Heat Source Product Development
- “Heat But Not Burn Product” Development
- Materials Science and Manufacturing
- R&D Management and Business Strategy
- Intellectual Property Rights and Strategies
- Corporate venture capital and private equity
- Innovation and innovation culture

RESEARCH and MANAGEMENT EXPERIENCE:

9/2013 - Present	President, 4D Strategies, Midlothian, VA 23113. Strategy & Innovation Consultant.
12/2008 - 9/1/2013	DIRECTOR, IP Management and Altria Ventures Fund, Altria Group, Inc. VA
9/2005 - 12/2008	DIRECTOR, Global Innovation, Philip Morris USA, Richmond, VA
8/2004 - 9/2005	PROJECT DIRECTOR, Identification of New Businesses, Philip Morris USA, Richmond, VA
7/2003 - 7/2004	STRATEGIC PLANNER, Operations & Technology, Philip Morris USA, Richmond, VA.
5/2000 - 6/2003	SENIOR PRINCIPAL SCIENTIST, RD&E Center, Philip Morris USA, Richmond, VA.
3/1999 - 5/2000	PRINCIPAL SCIENTIST, RD&E Center, Philip Morris USA, Richmond, VA.
3/1998 - 3/1999	ASSOCIATE PRINCIPAL SCIENTIST, RD&E Center, Philip Morris USA, Richmond, VA.
12/1994 - 1/1995	VISITING ASSOCIATE, California Institute of Technology, Pasadena, CA.
6/1995 - 8/1995	VISITING SCIENTIST, University of Cambridge, Cambridge, England.
8/1994 - 1/1996	GUEST SCIENTIST, Oak Ridge National Laboratory, Oak Ridge, TN.
1/1994 - 8/1998	SENIOR RESEARCH SCIENTIST, RD&E Center, Philip Morris USA, Richmond, VA.
8/1988 - 1/1994	RESEARCH SCIENTIST, RD&E Center, Philip Morris USA, Richmond, VA.
10/1985 - 8/1988	SENIOR RESEARCH ENGINEER, University of California, Davis, CA.
5/1982 - 10/1985	RESEARCH ASSOCIATE in ENGINEERING, Brown University, Davis, CA.
8/1977 - 5/1981	RESEARCH FELLOW, Indian Institute of Science, Bangalore, India

Research Experience:

The total Number of Google Citations is 20403 with h-index of 59 and i10-index of 147.

Development of Reduced Risk Next Generation Products:

Instrumental in the strategy, development and execution of materials, processes, testing and validation required for reduced risk products at Philip Morris USA and Altria since the Programs started in 1988. Managed, directed and was responsible for the research, product development, manufacture, testing, reliability and quality assurance aspects as a Project Leader, Program Leader and as a Director.

Established a diverse research group and laboratory and managed the program with several millions of dollars' budget. Managed employees, post-docs, research associates, interns, co-ops, and contractors. Managed over 20 external research contracts at US National Laboratories and at US, Japan and European Universities.

Made presentations to the Chairman, Vice-Chairman, and to the top senior management of the corporation.

Responsible for the identification, evaluation, protection, and recommendation of intellectual property on "advanced materials and technologies" for "heated tobacco products". Managed and created a diverse a patent portfolio on reduced risk products with close to 200 US Patents alone.

The technology know-how, knowledge and the manufacturing aspects of "heated tobacco products" were transferred to Philip Morris International's R&D team and to their partners prior to spin off from Altria. It became the basis for Platform 1 and Platform 2 of PMI's Reduced Risk Portfolio.

Heated Tobacco Product based on "Heat Source Technologies":

- Led, conceived and developed materials for "heat sources" to generate and maintain heat like "lit-end cigarettes" without generating excessive amounts of harmful compounds and ash. Fluidized bed technology was used to scale up the experiments using large reactors so that the powders are in fluid motion at the desired temperatures to react with the gases in the reactor. The resulting product is a UNIQUE heat source with compounds where in 98% of the CO is oxidized.
- The heat source materials and processes developed in the laboratories were scaled up to a pilot plant and the pilot plant data was used to "design and build a large scale continuous manufacturing plant" to manufacture the PATENTED heat sources. Managed and directed the mixing, extrusion, debinding and decomposition, machining, and quality control operations of heat source manufacturing and proper functioning of "heated tobacco products" during and after assembly.
- The properties of the heat sources were optimized such that the tobacco pellets placed behind the heat source are optimally heated by conduction and convection mechanisms upon puffing. Exothermic reactions were controlled such that the smokers could use "heated tobacco product" under normal puffing conditions for at least 8 puffs. Extensive product testing has shown significant reduction in harmful and potentially harmful constituents of smoke as compared to traditional cigarettes – as measured by tar, gas and vapor phase constituents of aerosol.

Heated Tobacco Product based on "Electrical Heating Technologies":

A wide variety of technologies were conceived and explored starting in 1990 to develop a product solely based on heating of tobacco to a *desired temperature* without depending on the combustion

processes of tobacco. This revolutionary concept required a heater, a means of controlling the temperature, an energy source to heat and control the temperature of a heater, and a unique tobacco rod that can only be heated without burning (hence the concept – “heat but not burn” to generate flavorful and sensorially acceptable aerosol during the 2 to 4 sec puff interval.

The product development efforts progressed from heating eight individual heaters in a linear manner to a design where eight heaters can be individually heated with a common base.

- Developed “amorphous” carbon heaters using powder metallurgical principles with varying electrical resistivity’s using phenol formaldehyde as the base material and as a binder. Electrical discharge machining was used to machine intricate carbon resistors with excellent quality to assemble linear electrical heaters into a linear electrically heated tobacco product using Ni-metal hydride as the battery. A thin film of gold was deposited to reduce the contact resistance.
- Developed a thermally efficient flat ceramic heater with a quick response time based on thick film technology using a substrate, resistor, and conductor using screen printing technology.
- Developed micro-heating elements using Phosphorous doped single crystal Si (100 plane) with a positive temperature coefficient of resistance to control the temperature rise during heating regime and to enable the use of pick and place equipment for the assembly of heaters.
- Carried out finite element thermal and electrical modelling to determine optimum heater design/s that can be heated eight times without burning tobacco present in an 8mm diameter tobacco rod. Extensive mathematical modeling efforts led to a design that can individually heat eight microheaters with minimal thermal, electrical, and energy losses.
- Manufacturing cost and speeds, matching of electrical resistivity to the energy source, and other parameters required exploration of a metallic heater that can come in contact with a tobacco rod. After extensive search and testing, Haynes 214 alloy (containing nickel and chromium) was selected as a heater material. To ensure protection from chromium present in the alloy, a thin layer of passive coating was developed on the Haynes 214 superalloy. This became the primary workhorse material to test the concept of a “heated tobacco product” and optimize the properties of a heater such that there is a significant reduction in harmful and potentially harmful products under acceptable sensory preferences of smokers. Heaters and electrically heated tobacco products were tested for 10,000 cycles under cyclic loading and unloading to determine the creep and life cycle times with and without a uniquely designed tobacco rod.
- As an alternate to the nickel and chromium based Haynes 214 alloy, electrically conducting high temperature ceramic composites based on molybdenum disilicide, silicon nitride, silicon carbide, and titanium carbide with varying resistivity’s were developed by the application of percolation theory. The composites were characterized for their TCR, thermal conductivity, oxidation resistance, and cyclic failure. Composites were machined into intricate shapes and designs, and tested their function as high temperature sensors, and resistors. The study has

been extended to develop functionally graded ceramic materials with conductive and resistive portions. The processes and products are unique, and received worldwide patents.

- Studied machinability of the materials using electrical discharge machining techniques, ultrasonic machining, and diamond cutting techniques to determine the cost effectiveness of machining from a systems and flexible manufacturing approach.
- Toxicity concerns associated with nickel and chromium elements in Haynes 214 led us to develop a new heater material exclusively based on alloys of iron and aluminum. Responsible for the alloy design, processing, characterization and development of high strength and creep resistant iron aluminides with exceptional oxidation resistance for use as a heater in “heated tobacco product”. Led the strategy for manufacturing of heaters and assisted in integration of heaters into the manufacturing of electrically “heated tobacco product” in Japan.
- An innovative electrically heated tobacco product with the potential to “reduce population harm” was introduced under the brand name “Accord” in Japan and in USA. Toxicological testing by colleagues confirmed that controlled heating of tobacco as opposed to burning of tobacco does significantly reduce harmful and potentially harmful constituents paving the way to create “reduced risk products” and potentially “reduce the harm to the population” as may be noted from the following:
 - A reduction of 20% to 30% in total particulate matter (TPM) in the smoke.
 - A reduction of 50% to 60% in tar and nicotine in the smoke.
 - A reduction of at least 90% in CO, nitrogen oxides, 1,3-butadiene, isoprene, acrylonitrile, aromatic hydrocarbons, hydrogen cyanide, aromatic amines, NNK, and phenol.
 - A reduction of at least 96% in the in vitro mutagenicity of TPM (in the Salmonella mutagenicity test in strains TA98 and TA100 with metabolic activation).
 - An 80% to 85% reduction in the in-vitro mutagenicity of TPM from the in the mouse lymphoma thymidine kinase assay (with and without metabolic activation, respectively).
 - An 82% to 85% reduction in the in vitro cytotoxicity of the TPM fraction and a 65% to 66% reduction for the water-soluble portion of the gas-vapor phase in the neutral red uptake assay using BALB/c 3T3 cells.
 - Both short-term (8-day) and long-term (12-week) clinical studies were conducted to assess *human exposure to selected cigarette smoke constituents*. The assessments were performed by measuring validated biomarkers of smoke exposure in adult smokers of ACCORD when switched from commercially available, conventional cigarettes. Changes in biomarkers of exposure in smokers of ACCORD were assessed to determine the reduced-exposure potential and found that significant decreases were noted in short, and long term clinical studies with ACCORD as compared to conventional lit-end cigarettes.
- Led and participated in many different strategic R&D projects between Philip Morris/Altria Group, Inc. and Philip Morris International prior to the spin off. Led and managed IP activities between the companies as part of the 10-year agreement between ALCS of Altria Group, Inc. and spun off entity Philip Morris International.

- Received two R&D 100 AWARDS known as “Oscars of Invention”.
- Recognized as a Member of the “Inventors Achievement Circle” in 1999, 11 years after joining the company. Listed as an inventor on 62 US Patents and over 150 international patents.
- Some of the US patents granted for the work on the “development of novel heated tobacco products” are listed below.
- [Method of manufacturing aluminide sheet by thermomechanical processing of aluminide powders](#)
- [Functionally stepped, resistive ceramic](#)
- [Flavor generating article](#)
- [Electrical heater of an electrical smoking system](#)
- [Heater element of an electrical smoking article and method for making same](#)
- [Method of manufacturing an electrical heater](#)
- [Electrical smoking system for delivering flavors and method for making same](#)
- [Tubular heater for use in an electrical smoking article](#)
- [Iron aluminide useful as electrical resistance heating elements](#)
- [Flavor generating article and method for making same](#)
- [Aluminum containing iron-base alloys useful as electrical resistance heating elements](#)
- [Method for making a carbonaceous heat source containing metal oxide](#)
- [Electrically powered ceramic composite heater](#)
- [Heater having a multiple-layer ceramic substrate and method of fabrication](#)
- [Method for making a carbonaceous heat source containing metal oxide](#)
- [Chemical heat source comprising metal nitride, metal oxide and carbon](#)
- [Flat ceramic heater having discrete heating zones](#)
- [Electrical smoking system for delivering flavors and method for making same](#)
- [Reinforced carbon heater with discrete heating zones](#)
- [Heater for an electric flavor-generating article](#)
- [Method for producing metal carbide heat sources](#)
- [Catalytic conversion of carbon monoxide from carbonaceous heat sources](#)
- [Electrically-powered heating element](#)
- [Chemical heat source comprising metal nitride, metal oxide and carbon](#)
- [Composite heat source comprising metal carbide, metal nitride and metal](#)
- [Electrically-powered linear heating element](#)

E-Vapor Products based on Heating of Liquid with Li-ion battery:

- Assisted in the development of an advanced e-vapor product with energy control, consistent characteristics of an aerosol, battery management system for Li-ion battery along with rapid

charging features, puff control and overheating and short circuit protection. The features were optimized based on rigorous consumer validation.

- To assure the consistency of aerosol delivery and composition, Li-ion batteries were selected based on the average battery capacity and % of retention after determining the charge-discharge cycling between 0.5 to 10C rates and up to 500 cycles.
- The safety of the batteries was tested based on thermal runaway and short circuit testing of batteries.

Hyperspectral Imaging Technology: Inventor on one US Patent Application

- Conceived, developed and implemented the hyperspectral imaging technology to understand the unique spectral features of agricultural leaves and products for quality control. Concept was proven in a laboratory prior to proving it with an upgraded pilot version, and later a commercial unit was built and proved the feasibility of the technology to classify agricultural materials and products. A three stage technology development led to the successful implementation of the technology for grading and for detection of foreign materials.

Capillary Aerosol Generation Technology:

- Application development was carried out on the aerosol generation by heated capillary method to pharma applications, consumer products, health care and transportation purposes. Licensed the technology to several companies and managed the licensing program.

LEADERSHIP and MANAGEMENT EXPERIENCE:

Intellectual Property Management:

- Recommended and established a patent monetization strategy and integrated the IP strategy with the short term and long term business strategies of the operating companies of Altria Group, Inc. IP was classified and protected based on the relevance to the business and realized cost savings of several million dollars.
- Established, directed and actively managed patent strategies of the operating companies, patent filings, strategic contracts, freedom to operate considerations, patent landscape analyses, and competitive technology assessments of adjacent products.
- Negotiated several complex technology licensing deals with major US and international companies with a total economic value exceeding over \$60 million. Executive in-charge, decision maker and negotiator for all R&D, licensing and patenting activities of Altria Corporation.
- Carried out IP due diligence as part of the integration efforts of acquired public and private companies – public company was bought for \$11.7 billion and private company for \$2.9 billion.

Altria Ventures Fund:

- Benchmarked and recommended Altria Ventures Fund to pursue high risk technology and product ventures by establishing an internal management process for determining the technology feasibility prior to investment recommendations.
- Established an internal management process to quickly select and act on deals in adjacent products or technologies of interest to Altria Group of Companies.

- Managed relationships with startup companies and responsible for completion of deal selection, vetting, cross-functional due diligence, negotiation and investment recommendations to the Executive Team of Altria Group, Inc.

Management:

- Managed over \$75 million of operating, expense, and capital budgets with financial analysts and identified cost savings of over \$10 million.
- Managed two successful Change Management assignments, reducing cost of R&D by tens of millions of dollars a year.
- Managed multi-million-dollar research programs across US and Europe and at national labs such as Argonne National Laboratory, Oak Ridge National Laboratory and academic institutions such as RPI, VCU, and Cornell University, CENIM, Spain, Hokkaido University, and Japan.
- Managerial experience since 1988. Managed researchers, supervisors, post-docs, contractors, Managers, Senior Managers and Senior Principal Scientists/Directors.
- Managed a pilot plant facility with nine employees and coordinated the activities of a manufacturing plant with 30 employees by working with quality assurance and engineering personnel.

Innovation:

- Led and managed the Open Innovation group and established tools to deliver innovations faster and cheaper which became the infrastructure of **Altria**, providing weekly updates on several major technologies, product, consumer and competitive trends around the world.
- Managed & implemented a software-based innovation tool to spur innovation and generate cost reduction and innovative ideas. The tool became instrumental to record savings of over \$100 million and is used company wide for innovation across the organization.
- Designed and executed a special one week-long executive education program at “**The Wharton School**” entitled “*Strategic Innovation*” for senior technical and management executives to enhance the innovative effectiveness of the organization with ethics as a business component. The program was executed three times and a total of 150 Directors, VP’s, and Sr. VP’s attended the class with an overall rating score of 4.54 over 5. The CEO of Altria Group gave a key-note lecture on the “leadership model and the responsibilities of an effective leader with ethics as a component”.

New Business Development:

- Worked on a special project with 14 high potential cross functional employees (Sr. Managers and Directors) of PM USA and 11 executives and associates of Booz Allen Hamilton to identify the *adjacent new business opportunities* (based on core capabilities and technologies) with over \$100 million revenue generation in three years - in consumer products, air purification and health care sector. The findings became the basis for the company to move into adjacent new businesses for sustaining growth. Several adjacent new products have been introduced into the marketplace and are in development.
- Spearheaded a special project with 30 internal and external experts and identified several business concepts for future growth based on market research, consumer research and technology inputs.

Strategic Planner:

- Member of the Strategic Planning Group of Operations and Technology comprising the functions of RD&E, Manufacturing, Quality, Compliance and Integrity, and Purchasing. Supported and carried out yearly and three-year strategic plans of Research and Science, Compliance and Integrity, and Research

and Technology and integrated the plans of Operations and Technology for presentation to the Executive Team of the Corporation. The group was responsible to the President of Operations and Technology.

HONORS/AWARDS/RECOGNITION

- **TMS Award Committee Member:** Select Winners for “Application to Practice”, “Alexander Scott Distinguished Service”, “Educator”, and “Leadership” Awards of TMS. **Term: 2011 - Present**
- **Judge,** MBA Case Study Competitions for William & Mary College, Virginia Tech, and Virginia Commonwealth University. 2012, 2013,
- **Member, ACG Cup,** Association for Corporate Growth, Richmond Chapter. **Term: 2011 - Present**
- **Guest Editor, “Special Issue: The Role of CTO”, Vol. 54, Number 3 (2011), Research-Technology Management, Industrial Research Institute.** The issue featured full length articles, viewpoints and interviews with thought leaders on national competitiveness, innovation models, and the role of technical leaders in creating innovation.
- **Guest Editor, “Special Issue: R&D and Business Strategy”, Vo.51, Number 5 (2008), Research-Technology Management, Industrial Research Institute.** The issue featured full length articles on the linkages and relationships between R&D and the business strategy.
- **Elected Chair, Board of Editors, Research-Technology Management, Industrial Research Institute. Term: 2007-2009.**
- **Invited Board of Editor, Research-Technology Management, Industrial research Institute. Term: 2004 - present.** Reviewed over 230 articles on innovation, leadership, portfolio management, intellectual property, and R&D Management.
- **Invited Editorial Review Committee, International Journal of Powder Metallurgy, APMI International, NJ. Term Period: 2004 – 2010.**
- **Invited Chair, ASM Fellows Award Selection Committee, ASM International. Term Period: 2004-2005.**
- **Adjunct Professor,** Department of Physics, Virginia Commonwealth University, Richmond, VA. Term: 2004 – present.
- **Adjunct Professor,** Division of Engineering, Old Dominion University. Term: 2004-2005.
- **Guest Editor, Intermetallics, Vol. 12(7-9), 2004.** For papers presented at the “Intermetallic and Advanced Metallic Materials”. Elsevier Science S.A. Editors: S.C. Deevi, P. Liaw, Y.P. Chang, and T.G. Nieh.
- **Invited Principal Editor, Journal of Materials Research, Materials Research Society. Term: 2003-2009.** Managed the Editorial Process of selecting three to four reviewers, making decisions on the manuscripts based on the reviews, and providing recommendations for publication or rejection on over 200 manuscripts during the term.
- **Invited Member, Editorial Board, Intermetallics, and Published by Elsevier Science S.A. Term Period: 1997-present.**
- **Member, Advisory Technical Awareness Council, ASM International, OH. Term: 2003-2004.**
- **Invited Editorial Review Committee, P/M Science & Technology Briefs, APMI International, NJ. Term Period: 2003-2004.**

- **Invited Member of Editorial Committee, International Materials Reviews**, Published by ASM International. **Term Period: 1993 to 2005.**
- **Guest Editor, Intermetallics, Vol.8 (9-11), 2000.** For papers presented at the “**Intermetallics for the Third Millennium**”. Elsevier Science S.A. **Editors: S.C. Deevi, C.T. Liu, and M. Yamaguchi.**
- **Invited Member of Editorial Committee, Journal of Thermal Spray Technology**, Published by ASM International. **Term Period: 1995-2001.**
- **Invited Member of Editorial Committee, Journal of Materials Engineering and Performance**, Published by ASM International. **Term Period: 1995-2001.**
- **Allan Ray Putnam Service Award, ASM International:** Cited “*for outstanding service to the Eastern Virginia Chapter through innovative programming and educational activities and for service to ASM International through leadership and organizational efforts in promoting materials conferences and editorial contributions to ASM International publications*”.
- **Won an R&D 100 Award - Oscars of Innovation:** For the invention and development of “*FeAl alloy having sulfidation, corrosion and oxidation resistances*”. Several tons of FeAl intermetallic sheets have been manufactured using a novel roll compaction and cold rolling technology. **Selected by R&D Magazine as one of the 100 Most Technologically Significant New Products of the year 2000.**
- **FIRST PLACE**, International Metallographic Contest, Class 2: Light Microscopy –for “*Reaction Synthesis of Iron Aluminide*”. Awarded by International Metallographic Society and ASM International, Cleveland, OH. Appeared in “*Materials Characterization*” and “*Slip Lines*”.
- **THIRD PLACE**, Product /Process Control, 2000 APMI P/M Metallography Competition for “*The Sintering of Iron Aluminide*”. Awarded by APMI International, Princeton, NJ. Picture was published in the International Journal of Powder Metallurgy.
- **Elected Fellow, ASM International, OH.** Elected in 1999 for “*Innovative Development and Commercial Applications of Reaction Synthesis Principles to the Production of Intermetallic Alloys*”.
- **Inducted into the Inventors Achievement Circle of Philip Morris in 1999:** Recognized for receiving 25 patents on the synthesis and processing of iron carbides and iron nitrides; thick film resistive technologies; resistive heating elements based on molysilicides and their composites; alloy design, processing, and commercial manufacture of FeAl and TiAl intermetallics.
- **Guest Editor, Materials Science and Engineering A, Vol. 259, 1998.** For papers presented at the International Symposium on “**Iron Aluminides: Alloy Design, Processing, Properties, and Applications**”. Elsevier Science S.A., 1998. **Editors: S.C. Deevi, D.G. Morris, V.K. Sikka, and J. H. Schneibel.**
- **Editor, Proceedings of the International Symposium on "Nickel and Iron Aluminides: Processing, Properties, and Applications"**, Published by ASM International, Materials Park, Ohio, 1997. **Editors: S.C. Deevi, P.J. Mazsiaz, V.K. Sikka, and R.W. Cahn**
- **Won an R&D 100 Award - Oscars of Innovation:** For the invention and development of Exo-Melt™ Process for melting and casting of Intermetallics. The process has been implemented for melting and casting of intermetallics. This became the key driver for commercialization of Ni₃Al heat treating trays and Ni₃Al rollers. **Selected by R&D Magazine as one of the 100 Most Technologically Significant New Products of the year 1995.**
- **Received a Continuing Educational Fellowship of Philip Morris, Inc.:** To carry out R&D on the processing of intermetallics at the Metals and Ceramics Division of Oak Ridge National Laboratory, at the Department of Materials Science and Engineering of California Institute of

Technology, and at the Department of Materials Science and Engineering of the University of Cambridge, England.

- **1994 Included** in Marquis WHO'S WHO IN THE WORLD, 12th Edition, Dec. 14, 1994.
- **1994 Included** in Marquis WHO'S WHO IN SCIENCE AND ENGINEERING, 2nd Edition, Jan. 1994.
- **1993 Action Cost Team Recognition Plaque and Cash Bonus.** Cited as "change a particular research unit with intricate machinery to a manufacturing process" with savings of \$772,000. June 8, 1993.
- **1990 Action Cost Team Recognition Certificate, JEWEL AWARD.** --- "change the stainless steel tooling in an extrusion process to ceramic" at a total savings of \$436,439. July, 1990.
- **1984 Received NATO Advanced Study Institute's Fellowship:** To attend an ASI course on "Applications of New Spectroscopic Techniques to Coal Science". August 1984.
- **1975-1977 Recipient of a Merit Scholarship Award,** From the National Council of Educational Research and Training, India.

SERVICE TO THE PROFESSION:

- *Invited Member, Metallurgical Transactions Joint Commission.* Term Period: 2003-2005.
- *Invited Member, ASM Fellows Selection Committee, ASM International.* Term Period: 2001-2004.
- *Sector Chair, Specialty Materials Sector, ASM International.* Term Period: 2000-2003.
- *Invited Member, Technical Programming Board, ASM International.* Term period: 2000-present.
- *Invited Member, Henry Marion Howe Medal and Marcus A. Grossman Young Author Awards Selection Committee, ASM International, Materials Park, OH.* Term Period: 1998-2001.
- *Member of the Technical Board, Publications Committee, APMI International, Princeton, NJ.*
- *Elected Unanimously as Chairman, ASM International, Richmond Chapter, Years: 1995-1996; 1996-1997; 1997 -1998.*
- *Chairman, Intermetallic Materials Group, ASM International, 1996 to 2002.*
- *Member, MDMD Powder Materials Committee, TMS, 1997 to 2002.*
- *Member, Mechanical Metallurgy Committee, TMS, 1996-1997.*
- *Invited Industrial Representative and Session Chair on Design of Critical Issues, DOE Workshop on Intermetallic Alloys, Atlanta, June 3-4, 1996.*
- *Program Subcommittee Member, "The Combustion Institute for the Twenty-Sixth International Symposium on Combustion" held at Naples, Italy, 1996.*
- *Committee Member, "Technical Books Committee", ASM International.* Term Period: 1993 to present.
- *Committee Member, "Materials Engineering Institute's Published Materials Division Committee", ASM International.* Term Period: 1993-1996.
- *Vice-Chair, ASM International, Richmond Chapter, 1994.*
- *Secretary, ASM International, Richmond Chapter, 1993-1994.*
- *Program Subcommittee Member, "The Combustion Institute for the Twenty-Fifth International Symposium on Combustion", held at Irvine, CA, 1994.*
- *Advertising Chair, International Society of Hybrid Microelectronics, Tarheel Chapter, 1992-1993.*
- *Chairperson, Membership Committee, ASM International, Richmond Chapter, 1992-1994.*
- *Chairperson, Program Committee, ASM International, Richmond Chapter, 1992-1994.*

- *Chairperson*, Long Range Planning Committee, ASM International, Richmond Chapter, 1991-1992.
- *Program Subcommittee Member*, “The Combustion Institute for the Twenty-Fourth International Symposium on Combustion”, held at Sydney, Australia, 1992.

TECHNICAL LEADERSHIP ACTIVITIES:

- *Program Organizing Committee Member*, 4th International Workshop on “**Ordered Intermetallic Alloys and Composites**”, 2003, Chengdu, China.
- *Program Organizer and Chair*, International Symposium on “**Intermetallic and Advanced Metallic Materials**” held March 3-6, 2003 at the TMS Annual Meeting, San Diego, CA.
- *Program Organizer*, International Symposium on “**Fuel Cells: Materials, Processing and Manufacturing Technologies**” held October 13-16, 2003 at the ASM Annual Meeting, Pittsburgh, PA.
- *Program Organizing Committee Member*, International Conference on “**Clusters and Nano-Assemblies: Physical and Biological Systems**”, Nov. 9-13, 2003, Richmond, VA.
- *Program Organizing Committee Member*, 2002 International Conference on “**Functionally Graded Materials: Technology Leveraged Applications**” May 6-7, 2002, Denver, Colorado.
- *Program Organizing Committee Member*, 4th International Workshop on “**Ordered Intermetallic Alloys and Composites**”, 2001, China.
- *Program Organizer and Chair*, International Symposium on “**Intermetallics for the Third Millennium**” held November 1-4, 1999 at the ASM Annual Meeting, Cincinnati, OH. The symposium identified the emerging areas of research and development in intermetallics.
- *Program Organizing Committee Member*, 3rd International Workshop on “**Ordered Intermetallic Alloys and Composites**”, April 5-10, 1998. Hangzhou, China.
- *Invited Member*, to represent *Intermetallics*, on the Program Committee of PM² TECH '98, 1998 International Conference on “**Powder Metallurgy & Particulate Materials**”, May 31-June 4, Las Vegas, Nevada. Also Session Chair of Direct Fabrication, and Intermetallics II sessions.
- *Program Organizer and Chair*, International Symposium on “**Iron Aluminides: Alloy Design, Processing, Properties and Applications**” held February 15-19, 1998 at the 1998 TMS Annual Meeting, San Antonio, TX.
- *Program Organizer and Chair*, International Symposium on “**Nickel and Iron Aluminides: Processing, Properties and Applications**” held October 7-9, 1996 at the ASM-TMS Materials Week, Cincinnati, OH. Symposium consisted of **Only Invited Presentations**.
- *Symposium Chairman*, “**Electrical Propulsion**”, Organized by the Air Force office Scientific Research, California Institute of Technology, Pasadena, CA, June 13, 1988.
- *Co - organizer* of the Sixth Army Research “*Engine/Fuels Workshop*”, Davis, March 17-18, 1986.

EXECUTIVE MANAGEMENT DEVELOPMENT:

- **“Private Equity and Venture Capital”**, Harvard Business School, Cambridge, MA, Nov. 2011.
- **“Private Capital Markets”**, Pepperdine University, LA, Oct. 2011.
- **“Investment Banking Institute”**, Washington, DC April, 2010.
- **Venture Capital Executive Program**, Haas School of Business, University of California, Berkeley, CA. Dec. 2010.
- **“Advanced Negotiation: Deal Design and Implementation”**, Harvard Law School, MA. June 2010.
- **Executive Certificate in “Health Sector Management”**, The Fuqua School of Business, Duke University. Nov. 2005.
- **“Certificate of Professional Development”**, The Wharton School, University of Pennsylvania, PA. March 2007.
- **“Strategic R&D Management Program”**, The Wharton – INSEAD Program at The Wharton School, University of Pennsylvania, PA. March 12-16, 2007.
- **“Program on Negotiation for Senior Executives”**, Program on Negotiation at Harvard Law School, May 11-12, 20006.
- **“IRI Business and IP Law for Technology Leaders”**, School of Law, Northwestern University, Evanston, IL. October 17-20, 2005.
- **“Strategic Innovation”**, The Wharton School, University of Pennsylvania, PA. September 25-30, 2005.
- **“Shaping Innovation Leaders”**, Kellogg School of Management, Northwestern University, June 16-23, 2003.
- **“Managing the Innovation Process”**, Institute for Management Development, Lausanne, Switzerland. October 2-7, 2000.
- **“Wharton Managing People: Power Through Influence Program”**, The Wharton School, University of Pennsylvania, PA. August 29 – September 1, 1999.
- **“Finance and Accounting for the Non-Financial Manager”**, The Wharton School, University of Pennsylvania, PA. October 26-31, 1997.
- **“Resource Allocation and Management Process”**, Ira Bitz & Associates, Richmond, VA. April 7-10, 1997.
- **“Critical Skills for Contemporary Leaders”**, Industrial Research Institute, St. Petersburg, FL. November 6-8, 1996.
- **“Center for Leadership Identification”**, Philip Morris, USA, Richmond, VA. October 15-18, 1996.
- **“Interpersonal Skills”**, American Management Association, Washington, DC. August 19-21, 1996.
- **“Advanced Business Lab”**, offered by Organization and Management Development as part of Mid-Management Development at Philip Morris, USA, Richmond, VA, 1992.
- **“Communicate to Get the Response You Want”**, American Management Association, Washington, DC. October 16 - 18, 1991.
- **“Frontline Leadership”**, Offered by Zenger and Miller as part of Mid-Management Development at Philip Morris, USA, Richmond, VA. Feb 14 - June 1990.
- **“Management Study Group”**, B-1, Industrial Research Institute, Baltimore, MD. January 10 - 12, 1990.
- **“Power and Positive Influence Program”**, an Executive Development Course offered by Situational Management Systems, Inc, Scanticon, NJ. Oct. 30 – Nov. 2, 1990.

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List of Published Papers by Seetharama C. Deevi

The total Number of Google Citations is 20403 with h-index of 57 and i10-index of 141.

Papers 29, 42 and 45 are the Top 25 Hottest Papers in Materials Science and Engineering: A for several years

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Seetharama C. Deevi is an Inventor on 65 US Patents and 3 US Patent Applications.

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Seetharama C. Deevi's Experience as an Expert Witness

Dates of Engagement	Case Name	Client	Law Firm	Venue	Deposition Testimony	Written Testimony	Court Testimony	Subject Matter
2018 onwards to 2022	PGR of US 10,492,542	Philip Morris International	Latham & Watkins	PTAB of US PTO	TWO	TWO		Technologies and Materials
	IPR of US 9,930,915	Philip Morris International	Latham & Watkins	PTAB of US PTO	TWO	TWO		Technologies and Materials
	IPR of US 9,814,268	Philip Morris International	Latham & Watkins	PTAB of US PTO	NO	ONE		Technologies and Materials
	IPR of US 9,901,203	Philip Morris International	Latham & Watkins	PTAB of US PTO	NO	THREE		Technologies and Materials
	IPR of 10,561,170	Philip Morris International	Latham & Watkins	PTAB of US PTO	ONE	THREE		Technologies and Materials
2022	IPR of 10,561,170	Philip Morris USA/ Altria Group, Inc.	Weil, Gotshal & Manges LLP	PTAB of US PTO	NO	ONE		Technologies and Materials
2022	ITC Investigation # 337-TA-1286	Next Level Ventures LLC, et al	Dentons	ITC	TWO	THREE	ONE	Technologies and Materials