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DATE OF BIRTH: February 18, 1943

EDUCATION

Degree of Doctor of Science in Metallurgy (1964), Degree of Master of Science (1963)
Massachusetts Institute of Technology, Bachelor of Science (1961) Banaras University.

POSITIONS HELD

- 1986-Present Tenured Full Professor, Materials Department
College of Engineering and Applied Science
University of Wisconsin–Milwaukee, Milwaukee, Wisconsin
Founder and Director of Research of Laboratories for Foundry, Solidification, and Tribology at UWM, and UWM Center for Composites
- Appointed
- 1996 Wisconsin Distinguished Professor, UWM
 - 1994 Foundry Education Foundation Key Professor
 - 1991 Ford/Briggs and Stratton Chaired Professor, UWM
 - 1988-90 Samuel C. Weaver Chaired Professor, UWM
 - 1986-89 Visiting Professor, Materials Science and Engineering, M.I.T
- 1977-1986 Founder Director (Equivalent to President and Chief Executive Officer in US) of Regional Research Laboratory (Trivandrum) and Regional Research Laboratory (Bhopal), Council of Scientific and Industrial Research, India. (Both are equivalent to National Laboratories in US with large numbers of scientific and administrative staff).
Conceived goals, set up, and directed research at two new Regional Research Laboratories worked on regional industrial needs and local resources, solidification, alloy development and composites. Served as Founder and Chief Executive Officer of these two institutions with large contingents of scientific and administrative staff. Involved in formulation of national and regional policies for technology and education.
Concurrently Visiting Full Professor I.I.T., Delhi, and Bhopal University, 1982-1984, and Visiting Full Professor, Indian Institute of Science (Bangalore), 1977-1980; Visiting Full Professor, University of California, 1983 (Fall).
- 1972-1977 Full Professor Indian Institute of Science, Bangalore, in Departments of Mechanical Engineering, Metallurgy, and Industrial Management, and

Director of Technology Forecasting and Management Center. Taught graduate and undergraduate courses in Materials Science, Solidification, Composites, Technology Forecasting, Long Range Planning, and Materials Policy. Guided doctoral and masters thesis research. Was involved in development of National and Regional policies on Technology and Education for the future.

- 1969-1972 Research Engineer, Homer Research Laboratory
Bethlehem Steel, Bethlehem, Pennsylvania
Research in Alloy Development, Castings, Composites
- 1968-1969 Visiting Faculty, Indian Institute of Technology, Kanpur, India
Teaching and research in Composites, Castings
- 1964-1968 Research Metallurgist, Merica Research Laboratory,
International Nickel, Suffern, New York
Research in Composites, Castings and Alloy Development

LISTINGS in Who's Who

1. Who's Who in Inventors of America
2. Outstanding Intellectuals of 20th century
3. Who's Who in American Science
4. Who's Who of Contemporary Achievement
5. Strathmore Who's Who directory
6. Who's Who of Asian Americans
7. Who's Who in the Sciences

CONSULTING EXPERIENCE

Considerable consulting experience with several leading manufacturing organizations with international development agencies in various countries and including but not limited to, UNIDO, UNEP, UNESCO, U.N. Office of Science and Technology, United Nations University (Tokyo, Japan) and World Bank. Wrote several reports on technology policy, materials and educational policy.

PATENTS AND PRODUCTS

Sixteen U.S. Patents, five Canadian and European Patents, five Indian Patents.
Developed several new products.

HONORS AND AWARDS

Banaras University Gold Medals for Outstanding Performance (1961).
Award for best work in light metals from American Foundrymen's Society (1969)
National Metallurgists' Day Award from the Ministry, India (1976)
Indranil Award from Mining and Metallurgical Society of India (1978)
Gold Medal Award for Technology for the Future from Indian Research Centre (1981)
Elected to Fellowship Institution of Engineers, India (1981)
Binani Gold Medal from Indian Institute of Metals for best paper (1982)
Distinguished Alumnus Award from Banaras Hindu University (1983)
Elected to Fellowship of Indian Institute of Ceramics (1983)
Elected to the Fellowship of American Society for Metals (1984)
Distinguished Engineer Award from Association of Engineers from India (1984)

Elected to Fellowship of Institute of Metals, London (1985)
 Received National Research and Development Corporation Award (1986)
 World Intellectual Property Organization Award (1986)
 VHP Award for Excellence (1987)
 Outstanding Research Award from College of Engineering and Applied Science, UWM (1988)
 Awarded the Samuel C. Weaver Professorship in Materials Engineering (1988)
 Elected to the Fellowship of American Association of Arts and Sciences (1989)
 Elected to the Corresponding Fellowship of Third World Academy of Sciences (1990)
 Appointed to the Joint Commission of Metallurgical Transactions (1990)
 Awarded the Ford/Briggs and Stratton Professorship (1991)
 Received the UWM Foundation Outstanding Research Award (1991)
 Received CEAS-UWM Outstanding Service Award (1992)
 Elected to the Fellowship of Third World Academy of Sciences (1993)
 Appointed Foundry Education Foundation Key Professor at UWM (1994)
 Selected as ASM-IIM Lecturer (1994)
 UWM Foundation Distinguished Service Award for Distinguished Public Service (1995)
 Wisconsin Distinguished Professorship (1996)
 Listed in 11000 Year Timeline of Metal Casting (1996)
 M. Schiel Award for Excellence in Metallography, First Prize, ASM, Milwaukee Chapter (2000)
 Hall Heroult Scientific Merit Award by American Foundrymen's Society (2000)
 Silver Anniversary Lecture for Aluminum Division, American Foundrymen's Society (2001)
 Visiting Lecture Series for Milwaukee School of Engineering (2001)
 M. Schiel Award for Excellence in Metallography, First Prize, ASM, Milwaukee Chapter (2001)
 M. Schiel Award for Excellence in metallography, Third Prize, ASM, Milwaukee Chapter (2002)
 Microscopic Society of America Award for Physical Sciences to co-authored paper (2002).
 Silver Jubilee Lecture, Regional Research Laboratory (CSIR), Trivandrum, Kerala (2003).
 M. Schiel Award for Excellence in Metallography, Third Prize, ASM, Milwaukee Chapter (2003)
 NRI Institute Award of Excellence (2004)
 M. Schiel Award for Excellence in Metallography, Third Prize, ASM, Milwaukee Chapter (2004)
 Rohatgi Honorary Symposium on Metal Matrix Composites organized by TMS (held March 2006)
 Honorary Medal from motor Transport Institute, Warsaw, Poland

BOOKS AUTHORED AND EDITED:

1. Principal Author of a textbook on *Technology Forecasting*. Tata-McGraw Hill, 1979 (Reprinted)
2. Principal Author and Co-editor, 'Materials Science and Technology in the Future of India', published by Regional Research Laboratory (Trivandrum), INSDOC, CSIR (India), 1980.
3. Principal Author and Co-editor, 'Materials Science and Technology in the Future of Kerala', published by Regional Research Laboratory (Trivandrum), INSDOC, CSIR (India), 1980. (Focus was on the regional imperatives in the state of Kerala)
4. Principal Author and Co-editor, 'Materials Science and Technology in the Future of Madhya Pradesh (India)', published by Regional Research Laboratory (Bhopal), INSDOC, CSIR (India), 1980. (Focus was on the regional imperatives in the state of M.P)
5. Principal Author and Co-editor of *Tribology of Composite Materials*, ASM International, 1990.

6. Principal Author and Editor, *Solidification of Metal Matrix Composites*, TMS, 1990.
7. Principal Author and Editor, *Microstructure Formation during Solidification of Metal Matrix Composites*, TMS 1993.
8. Co-author of book, *Natural Fiber Composites*, Periodical Experts Book Agency, 1994.
9. Principal Author and Co-editor, *Friction, Wear and Lubrication of Metal Matrix Composites*, ASM International 1994.
10. Principal Author and Editor, *Processing, Properties and Applications of Cast Metal Matrix Composites*, ASM International 1997.
11. Principal Author and Editor, "State of the art in Cast Metal matrix Composites", published by TMS, Oct., 2000

Books and Proceedings in Progress: *Casting of Metal Matrix Composites*, *Principles of Solidification of Metal Matrix Composites*.

AUTHORSHIP OF RESEARCH PAPERS

Over 260 research papers in materials science and engineering in refereed research publications, including Metallurgical Transactions, Materials Science and Engineering, Journal of Materials Science, Scripta Metallurgica, Composites, SAE, Fiber Science, Tribology International, Transactions of American Foundrymen's Society, Acoustics Letters, Acta Materiala. (List A)
Additional 140 research papers in Materials Science and Engineering in Proceedings, many of which were refereed. (List B)

Additional 65 papers have been written in technology forecasting, materials policy and educational policy in journals and proceedings. These relate to research in quantitative policy studies on technology and education in the future. (List C)

PRESENTATION AND INVITED PAPERS

Made several hundred presentations to professional societies, Wisconsin Area Research Managers Meeting, Milwaukee Chamber of Commerce, Great Lakes Composites Consortium. Invited to make presentations in U.S., India, Russia, Europe, Japan, Australia, Mexico, Singapore, China, Jordan and Egypt in 1991-1998. Invited to present papers in NATO Conference, 1998.

EDITORIAL AND REVIEWING EXPERIENCE

Served on the Board of International Editors, International Cast Metals Research Journal of American Foundrymen's Society (72-76), Technology Forecasting and Social Change (U.S.A.) (80-86), Transactions, Indian Institute of Metals (79-84), High Temperature Materials (83-88), Metallurgical Transactions (USA) (87-94), Materials for Energy (USA) (86-89), Advanced Materials and Processes (USA) (88-94), Composite Materials Science (U.K.) (86-88), Materials Conservation and Recycling (U.K.) (88-90), Journal of Materials Shaping Technology (USA) (88-92), Journal of Scientific and Industrial Research (India) (81-86), Journal of Materials Engineering and Performance (USA) (93-95), Aluminum Transactions (98-). Journal of Materials Processing Technology (99 -).

Reviewed proposals for NSF, National Academy of Science, Wisconsin Solid Waste Program, U.S. Civilian Research and Development Fund, Served on NSF review panels on Composites, Materials, Nanomanufacturing.

FELLOWSHIPS AND MEMBERSHIPS IN PROFESSIONAL SOCIETIES

Fellow of: Institution of Engineers, Institute of Ceramics, American Society of Metals; Institute of Metals and Materials, London; American Association for Advancement of Arts and Sciences, Third World Academy of Science, Italy.

Member of: Materials Research Society, The Materials and Metals Society, ASM International, American Foundrymen's Society, American Composites Society, SME, Society of Automotive Engineers, Steering Committee: Institute of High Technology and Materials, Trieste, American Society of Mechanical Engineers, Materials Research Society, World Futures Society (Milwaukee Chapter), Registered Professional Engineer in the State of Wisconsin.

COMMITTEE WORK IN PROFESSIONAL AND GOVERNMENT ORGANIZATIONS

Served on Advanced Technology Awareness Council, Solidification Committee and Composites Committee of ASM and AIME, Putnam Award Committee ASM

Served on Councils of I.I.M and Universities at Trivandrum and Bhopal

Served on Board of Directors of M.P. Energy Corporation, and Moulana Azad College of Technology; National Committee on Science and Technology, Long Range Planning, and Futures Research Panels of Government of India

Steering Committee World Future Society, Milwaukee Chapter

Technical Advisory Board of PTSM

Advisor, Cooperative Automotive Research Group(CAR),Government of India

Coal Advisory Group, Department of Energy, U.S.

Steering Committee Nanotechnology and Mems Technical Group, Society of Manufacturing Engineers

COMMITTEE WORK AT UW SYSTEM:

1. Awards and Recognition Committee, CEAS (1990-1994)
2. Chair, Graduate Program Subcommittee since Sept, 1999-2004, Member since 1995 (CEAS)
3. Executive Committee, Materials Department (since 1985)
4. Executive committee, Industrial and Manufacturing Engineering (1987-1989)
5. TQM Research and Scholarship Subcommittee, CEAS (1995)
6. Advisory Committee, Advanced Analytical Facility, UWM (1995-2000)
7. UW System Solid Waste Research Council, Madison (1998-2004)
8. Task Force on Jobs in Greater Milwaukee Foundry Industry, UWM Center for Economic Development (2000)
9. Chair, Research Committee; CEAS (1998)
10. UWM representative on Wisconsin Space Grant Consortium (1999 - 2003)
11. Action Team Member of Technology Center Program, Milwaukee Idea (1999 - 2003)
12. CEAS alumni Association – Materials Department Representative (1999 -)
13. UWM Faculty Forum on International Studies and Programs (1999-)
14. Member, “Center for Peace Studies,” (1999 - 2000)
15. CEAS Engineering Management Oversight Committee (2002 - 2004)
16. CEAS Growth Plan Implementation Commission (2002-)
17. CEAS Strategic Planning Committee (2004 -)
18. Academic Planning Committee on Bachelors of Arts in Global Studies, Center for International Education (2005 -)

SELECTED INSTITUTIONAL AND INDUSTRIAL CONTACTS IN WISCONSIN:

Briggs and Stratton, Harley Davidson, Badger Meter, Wisconsin Electric, Eck Industries, AO Smith Corp., Oshkosh Trucks, Amalga, Mechanical industries, Waupaca Industries, Falk Corp., Mercury Marine, Grede Foundries, Wisconsin Area Research Managers, Metropolitan Milwaukee Chamber of Commerce, American Foundrymen's Society (Wisconsin Chapter), Energy Center Wisconsin Medical College (Milwaukee), Marquette University, MATC, University of Wisconsin (Madison).

Steering Committee Member: Milwaukee Ethnic Council.

Board Member: Wisconsin Coalition of Asian-Indian Organizations

MAJOR RESEARCH CONTRIBUTIONS WIDELY CITED IN TEXTBOOKS AND JOURNALS IN MATERIALS

Theoretical Models and Experimental Work on Dendritic Solidification

Solidification of Metal Matrix Composites during Casting

Structure Property Relationships in Composites

Polymer Natural Fiber Composites

Materials Policy, Education Policy, Technology Policy

Invited chapters have been included in Handbooks, and International Materials Reviews.

STUDENT SERVICE:

Provided opportunity for undergraduate and minority high school students to participate in research in UWM Composites Center, including some under National Institutes of Health and National Center for Research Resources Program, and National Science Foundation Program. Participated in Student Multicultural Activities, including service as Advisor to Students of India and helped organize Students of India Day at UWM (1991-99). Served as Foundry Education Foundation Key Professor. Arranged Foundry Education Foundation Scholarships for several UWM students, in addition to teaching courses and serving as thesis advisor to several students. Faculty advisor to American Foundrymen Society Student Chapter at UWM.

RESEARCH GRANTS AND PROGRAMS

In the last eight years, cash extramural funding of over 4.0 million dollars, and equipment donations of over \$500,000 have been received from industry. Research grants, gifts and contracts were from Ford, General Motors, Briggs and Stratton, Electric Power Research Institute, Sundstrand Corporation, Control Data, International Copper Association, Aluminum Company of Canada, Norsk Hydro (Norway), Third Millennium, Commonwealth Aluminum Company (Australia), Oiless (Japan), Office of Naval Research, Department of Energy, Department of Commerce, NSF, Amalga Composites, A. O. Smith, NS Power Co., PSI Energy, Oshkosh Trucks, Thompson Aluminum, Precision Thin Metals, Argotech, CInergy, ARGOTECH, Wisconsin State Development Grant, DIN Grant from UW System, Wisconsin Applied Research Grant, and Wisconsin Distinguished Professor Grant. Participated in writing the research proposal for Great Lakes Composites Consortium, Kenosha, Wisconsin, funded by the Navy.

PI for (a) NSF ERC proposal on Manufacturing of Composites from UWM (b) NSF pre-proposal on "Low Cost Manufacture of Advanced Materials" (\$15 M) and (c) NSF MRSEC proposal on "Advanced Materials" (\$13 M); (these involved participation of several departments and schools at UWM, and other institutions in Milwaukee and out of state institutions; not funded). Co PI with IITRI on Army Mantech Program on Power Transfer Systems. (\$25M for five years); PI on Defense Appropriation Proposal on "Lightweight Materials for Military Transport Applications" (funded for 2004), NSF-NER grant on Nanocomposites. As Director in CSIR, administered grants equivalent to two million dollars per year. Organized International Collaborative Research and Student Exchange Programs between (a) UWM and two institutions in Poland through DOC and (b) UWM and four institutions in India.

ADMINISTRATIVE AND ORGANIZATIONAL EXPERIENCE

Served as Chief Executive Office and Founder Director of two research laboratories of Council of Scientific and Industrial Research. These were research and advanced training institutions with large contingents of scientific and administrative staff, carried out all functions of recruiting, budget control and personnel management. Planning and organization of these two institutions from their conception. Organized and administered Technology Forecasting and Management Center at the Indian Institute of Science. Organized laboratories for foundry, solidification, and tribology and UWM Center for Composites at the University of Wisconsin-Milwaukee and served as their Founder Director. Organized and served as chairman of several technical sessions, such as ASM and AIME conferences, including two sessions at the World's Materials Congress, 1988. Organized the first conference on "Solidification of Metal Matrix Composites," in 1989 for AIME-ASM and "Tribology of Composites," for ASM in 1990. Invited to serve on the steering committee of International Institute of High Technology and Materials, Trieste, Italy, and to direct and organize their first composites workshop, by Dr. Abdus Salam, Nobel Laureate. Organized and chaired sessions on "Tribology of Composites" and "Solidification of Composites," during Materials Week, Chicago, 1992, and Materials Week, Pittsburgh, 1993, and Materials Week, Chicago, 1994. "International Conference on Cast Composites," October 18-20, Zakopane, Poland. Organized "Cast Metal Matrix Composites" sessions for materials week, 1996. Served on Councils and Boards of Kerala University, Bhopal University, M.P. Energy Corporation. Organized "State of the Art in Cast Metal Matrix Composites," Conference for ASM and TMS in the year 2000.

VOLUNTEER WORK IN COMMUNITY

1. Steering Committee Member: Milwaukee Ethnic Council (2002-)
2. Board Member: Wisconsin Coalition of Asian Indian Organizations (2002-)
3. Founder Member: Hindu Temple, Wisconsin
4. Founder Member: American Society of Engineers from India, Wisconsin Chapter.
5. Several talks on National Public Radio on Materials Technology, International Issues, Environmental Issues.