

Name

Mr. D.Srinivas Rao

**Date of Birth**

25.06.1965

Designation

Scientist-F

Qualification

M.S. (Mechanical Engineering), National Technical Institute, Kiev, Ukraine (1991).

Professional experience:

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| 1991 – 1995 | Scientist, Indo-Soviet Advanced Powder Metallurgy Institute, Hyderabad, India. |
| 1995 – Till date | Senior Scientist, Team Leader, Centre of Excellence for Engineered Coatings, International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI), Hyderabad, India. |

Research areas of interest

Thermal Spray Coating Technologies like Detonation Spray Coatings, Cold Gas Dynamic Spraying, Solution Precursor Plasma Spraying, High Velocity Oxy Fuel, Powder and Wire Flame Spray Coatings as well as Electron Beam Physical Vapour Deposition Coatings, Electro Spark Coating, Micro Arc Oxidation, Nano Composite PVD Coatings and pulsed electrodepositing technologies.

Research projects conceived

List of Sponsored Projects accomplished and ongoing projects (As a Principle and Co-Principle Investigator)

- Development Of Thermal barrier coatings On HPT Blade & Vane For Kaveri Engine of LC Aircraft, DMRL, Hyderabad
- Development of Erosion wear resistant coatings on boiler tubes (THERMAX, Pune)
- Development of Corrosion wear resistant coatings on components used in Submarine ship ,(DMDE, Hyderabad)
- Development of high temperature oxidation resistant coatings on land based gas turbine blades (NTPC)

- Investigation Of Possible Thermal Barrier Coating Systems for Protection of Candidate Materials for HSDTV, DRDL
- Establishment of National Facility on Electron Beam Physical Vapour Deposition Technology (SERC-DST, DRDO and ARCI)
- Development of Coatings to Combat Silt Erosion for Possible use on Hydroelectric Power Components (NHPC)
- Performance Evaluation of ESC coated Twist Drills (SERC-DST)
- Use of SHS & Mechanically Alloyed Powders in DSC (Indo-Poland S&T Collaboration)
- Development of wear resistant coatings using ultra fine WC-Co powders sponsored by Aero R&D Board, DRDO
- Development of wear resistant coatings for bamboo material cutting tools (TIFAC)
- Influence of Silicon Content on Properties of Powdered Ni–Cr–Al–Y Coating Obtained by Detonation Spray Coating Technique (Indo-Ukraine joint project of S&T cooperation)
- Effect of Rare-Earth Dopants on Thermal Stability and Fracture Toughness of Nanocrystalline Zirconia-Based Thermal Barrier Materials (SERC-DST)

Awards and honors

- Centre Coordinator, Indo-Russian Science and Technology Centre, Delhi Unit
- Vigilance Officer, International Advanced Research Centre for Powder Metallurgy and New Materials, Hyderabad, 2007-2014
- Convener, Indo-Belarus Workshop on Material Science and Metallurgy, November 15-16, 2012, Hyderabad.
- Course Director, Surface Engineering Technologies : Research and Applications (SETRA), August 27-31, 2012
- Convener, Local organizing committee for Indian National Academy Of Engineers Annual Convention, 23rd to 24th December 2011
- Convener , ARCI-MIAE 2 days workshop, Hyderabad during 26-27 January 2011
- Received a Best engineer award by Lions Club International on 19.09.2010, organized on Engineers day celebrations by Lions Club International, District 324.
- Course Director, SERC & NAM Center (DST) sponsored School on Surface Engineering, 19-25th July 2005, participants from NAM countries and Academic Institutes & Industries in India.

- Course Director, School on Surface Engineering, sponsored by Department of Science & Technology, (DST) 16-23rd July 2003, received overwhelming response from all over India encompassing premier educational institutes, research laboratories, public sectors and private industries
- Convener, Local organizing committee, International Conference on Advances in Surface Treatment: Research & Applications (ASTRA-2003) Nov 3-6, 2003
- Convener, Local organizing committee, Indo-French Workshop on Thermal Spraying, November, 2002, Hyderabad, India
- Special Invitee member, Technical Advisory Board (TAB) and Technology Information Forecasting and Assessment Council (TIFAC) for transfer detonation spray coating technology to private entrepreneurs in India
- External Review member of SERC sponsored projects on Robotics and Manufacturing
- External expert member for recommendation of suitable protective coatings for Marine Kaveri Engine, Establishment of shot peening and thermal spray coating facilities at GTRE(DRDO), Bangalore
- External expert member for recommendation of suitable protective coatings for Marine Kaveri Engine, Establishment of shot peening and thermal spray coating facilities at GTRE(DRDO), Bangalore
- Member, Oversight Committee for Materials Characterization for KMGT Engine
- Member, Review Committee for Materials, KMGT Engine
- Convener, Local Organizing Committee for two days workshop on Surface Engineering & Business Promotion, held at Hyderabad on 6-7th January, 1999
- Core member of Organizing Committee for International Exhibition and Seminar on Powder Metallurgy and New Materials, INSOVEX-II, held at Hyderabad on 6-8th December, 1991
- Active member of Organizing Committee for conducting an International Exhibition on Powder Metallurgy and New Materials, INDOCIS-96, held at ARCI, Hyderabad on January 17-19th, 1996.
- Coordinator, One Day Workshop on Electrospray coating Technologies, held at ARCI, Hyderabad on 18th May, 1996

List of journal publications

International and National Journals/Proceedings Publications

- Nirmala.S, G.Sivakumar, AS.Joshi, N.Aruna, D.Srinivasa Rao and G.Sundararajan, A computer-based approach in developing functionally graded and layered coatings with Detonation Spray Coating process, Journal of Science and Industrial Research, Vol.72, August 2013,pp.477-480.
- Sanjay.B. Karuna Jain, D.Srinivasa Rao, SV Joshi,Technology Commercialization in Advanced Materials Sector: A Case Study , Journal of Engineering and Technology Management (in press)
- D. Srinivasa Rao, G. Ranga Janardhan, Krishna Valleti, S.V. Joshi, Processing-Structure-Property Relationships in EB-PVD Ytria Stabilized Zirconia (YSZ) Coatings, Journal of Vacuum Science & Technology A 29, 2011
- Naveen Manhar Chavan, M.Ramakrishna, P.Sudharshan Phani, D.Srinivasa Rao and G.Sundararajan, Influence of Process Parameters and Heat Treatments on Properties of Cold Sprayed Silver coatings, Surface and Coating Technology, 205 (2011), p.4798-4807
- Dipak K. Das, S. Gokul Laxmi, D.Srinivasa Rao, S. Bhanumathi and A.K. Singh, Microstructure, Texture and Thermal Cycling Performance of EB-PVD TBCs Deposited under Different Processing Conditions, Journal of High Temperature Materials and Processes, Vol.30(2011),pp.539-548
- D.Sen, Naveen M Chavan, D Srinivasa Rao and G.Sundararajan, “Influence of grit blasting on bond strength of detonation sprayed coatings”, J. Thermal Spray Technol, Vol 19(4), June 2010, p805
- G. Sundararajan, G. Sivakumar, D. Sen, D. Srinivasa Rao and G. Ravichandra, “The tribological behaviour of detonation sprayed TiMo(CN) based cermet coatings”, International Journal of Refractory Metals & Hard Materials 28 (2010) 71–81.
- Naveen Manhar Chavan, P. Sudharshan Phani, D. Srinivasa Rao and G. Sundararajan , “Effect of Process Parameters and Heat Treatments on the Properties of High Conductivity Cold Sprayed Silver Coatings” was published in the Proceedings of 3rd ASIAN THERMAL SPRAY CONFERENCE (ATSC-1060), 6-8 Nov 2008, NTU, Singapore
- K.R.C.Soma Raju, Nadimul Haque Faisal, D.Srinivasa Rao, S.V.Joshi and G.Sundararajan, “Electro-Spark Coatings for Enhanced Performance of Twist Drills”, Surface and Coatings Technology 202 (2008) 1636–1644.

- P. Sudharshan Phani, D. Srinivasa Rao, S.V. Joshi, and G. Sundararajan, "Effect Of Process Parameters And Heat Treatments On Properties Of Cold Sprayed Copper Coatings", *Journal of Thermal Spray Technology* Volume16(3) September 2007, pp 425-434
- P. Suresh Babu, D. Srinivasa Rao, G.V.N. Rao and G. Sundararajan, "Effect of feedstock size and its distribution on the properties of detonation sprayed coatings" "*Journal of Thermal Spray Coating Technology*" Volume16(2) June2007, pp 281-290
- V.Yu.Ulianitsky, A.A.Shterter, S.B.Zlobin, D. Srinivasa Rao and G.Sundararajan, "Structure and Tribological Properties of wear-resistant Coatings made by Detonation Spraying", *Journal of Material Science (In Russian)*, (2006) (in press)
- Jino George, Parag Bhargava, D.Srinivasa Rao and S.V. Joshi, Integrity Of Detonation Sprayed CrxCy/NiCr Coating Under Exposure To Thermal Cycling, *Advances in Applied Ceramics*, Volume 105, Number 3, June 2006, pp. 148-152(5).
- L. Ramakrishna, D.Sen, D.Srinivasa Rao and G.Sundararajan, *Coatability and Characterization of Fly Ash Deposited on Mild Steel by Detonation Spraying*, *Journal of Thermal Spray Technology* 12 (1) 2003 p.77.
- JKN. Murthy, D.Srinivasa Rao and B. Venkataraman, *Effect of grinding on the erosion behaviour of a WC-Co-Cr coatings deposited by HVOF and Detonation Gun Spray process*, *Wear* 249 (2001) 592-600.
- G.Sundararajan, G.Sivakumar and D.Srinivasa Rao, *The Interrelationship between Particle Temperature and Velocity, Splat Formation and Deposition Efficiency in Detonation Sprayed Al₂O₃ Coatings*, *Proceedings of the International Thermal Spraying Conference 2001, Singapore*, P.849-858.
- G.Sivakumar, L. Ramakrishna, G. Madhusudhan Reddy, Vipin Jain, D.Srinivasa Rao and G.Sundararajan, *The Influence of the process parameters on the Properties of Detonation Sprayed WC-12Co Coatings*, *Proceedings of the International Thermal Spraying Conference 2001, Singapore*. P.1031-1038
- P.Saravanan, K.R.C.Somaraju, D. Srinivasa Rao, V.Selvarajan, S.V.Joshi and G.Sundararajan, *Influence of process variables on the quality of detonation gun sprayed alumina coatings*, *Journal of Surface and Coating Technology* 123 (2000) 44-54.
- K.R.C. Somaraju, D. Srinivasa Rao, G.Sivakumar, D. Sen, and G. Sundararajan, *The Influence of Powder characteristics on the properties of Detonation sprayed Cr₃C₂-25NiCr coatings*, *Proceedings of the International Thermal Spraying Conference 2000, CANADA* p. 309-316.

- P.Saravanan, V.Selvarajan, D. Srinivasa Rao, S.V.Joshi and G.Sundararajan, *Study of Plasma and Detonation Gun Sprayed Alumina Coatings using Taguchi Experimental Design*, Journal of Thermal Spray Technology, Volume 9(4) December 2000, p.505-512.
- P.Saravanan, V.Selvarajan, D. Srinivasa Rao, S.V.Joshi and G.Sundararajan, *Application of Taguchi Method to the Optimization of Detonation Spraying Process*, Materials and Manufacturing Processes, Vol.15, No1, p.139-153, 2000.
- M. Roy, C.V.S Rao, D. Srinivasa Rao, and G.Sundararajan, *Abrasive wear behaviour of Detonation sprayed WC-Co coatings on mild steel*, Journal of Surface Engineering 1999, volume.15, No.2.p129-136
- Manish Roy, Subba Rao, D. Srinivas Rao and G. Sundararajan, *□Abrasive wear behaviour of detonation sprayed WC-Co coatings□*, Surface Modification Technologies XII, edited by T.S. Sudarshan, K.A. Khor and M. Jeandin, The Institute of Metals, London, 1999, Vol15, pp. 129-136
- D. Sen, K.R.C. Somaraju, D. Srinivasa Rao, and G. Sundararajan, *The Influence of Teflon Additions on the Properties of WC-CO Coatings Obtained by Detonation Gun Coating*, Proceedings of the XIIIth Surface Modification Technologies, Eds. T.S. Sudarshan, K.A. Khor and M. Jeandin, Pub. The Institute of Materials, London, 1999,p.71-81.
- P.Saravanan, K.R.C.Somaraju, D. Srinivasa Rao, V.Selvarajan, S.V.Joshi and G.Sundararajan, *A Comparative Study on the Performance of Two Diverse Detonation Spray Systems*, Proceedings of the XIIIth Surface Modification Technologies, Eds. T.S. Sudarshan, K.A. Khor and M. Jeandin, Pub. The Institute of Materials, London, 1999,p.195-205.
- Sundararajan, G., K.U.M.Prasad, D. Srinivasa Rao, and S.V.Joshi, *A Comparative Study of Tribological Behaviour of Plasma and D.Gun Sprayed Coatings under Different Wear Modes*, Journal of Materials Engineering and Performance, volume 7(3), June 1998. P.343- 351
- D. Srinivasa Rao, D.Sen, K.R.C.Somaraju, S.Ravi Kumar, N.Ravi and G.Sundararajan, *The influence of powder particle velocity and temperature on the property of Cr₃C₂-25NiCr coating obtained by detonation-gun*, Proceedings of the 15th International Thermal Spraying Conference, Nice, France, 1998. P.385-393.
- G. Sundararajan, D. Srinivasa Rao, D. Sen, K.R.C. Somaraju, *Tribological Behaviour of Thermal Sprayed Coatings*, Proceedings of the XIth Surface Modification Technologies, Eds. T.S. Sudarshan, K.A. Khor and M. Jeandin, Pub. The Institute of Materials, London, 1998,p.872-886.

- G. Sundararajan, K.R.C. Soma Raju and D. Srinivasa Rao, *The Prospects for the Development of High Performance Alumina Coatings Using Detonation Gun Technique*, Proceedings of the Xth Surface Modification Technologies X, Eds. T.S. Sudarshan, K.A. Khor and M. Jeandin, Pub. The Institute of Materials, London, 1997, p.369-84.
- T.P.Bagchi, Bijoy Sarma, D. Srinivasa Rao, and D.Sen, *Detonation Coating Process of LP Turbine blades-A Statistical Quality Control Approach*, Transactions of the Powder Metallurgy Association of India, P. Ramakrishnan (ed.), 1996, Vol.23,
- D. Srinivasa Rao, K.P.Rao, and T.P.Bagchi, *Wear Resistant Coating of Turbine Blades by Detonation Gun*, Transactions of the Powder Metallurgy Association of India, P. Ramakrishnan (ed.), 1995, Vol.22, p.56-59.
- D. Srinivasa Rao, K.P.Rao, T.P.Bagchi and Bijoy Sarma, *Coating of WC-Co and WC-Ni powders on Metal Substrates with Detonation Gun*, Transactions of the Powder Metallurgy Association of India, P. Ramakrishnan (ed.), 1994, Vol.21, p.62-66.
- D.Srinivasa Rao, T.P.Bagchi and G.S.Bhattacharjee, *Detonation Coating Process: Some Selected Case Studies*, Transactions of the Powder Metallurgy Association of India, P. Ramakrishnan (ed.), 1994, Vol.21, p.74-80.
- V.Kadyrov, Margarita.Y, Sen, D.Srinivasa Rao, K.P.Rao and A.V.Saibaba, *Detonation Coating Process*, Transactions of the Powder Metallurgy Association of India, P. Ramakrishnan (ed.), 1993, Vol.20, p. 1-5.

Contribution to books

Book Chapters

- G. Sundararajan, **D.Srinivasa Rao**, G. Sivakumar and S.V.Joshi, A book chapter on "Detonation Spray Coatings" Encyclopedia of Tribology, DOI:10.1007/978-0-387-92897- Springer Science+Business Media.
- **D.Srinivasa Rao**, "*Detonation Spray Coatings*" in "Surface Engineering : Process Fundamentals and Applications", Lecture Notes Of International Training Course And Business Opportunities Workshop On Surface Engineering , Published by NAM S&T Centre, Chapter 4 ,2009, Editors: D.Srinivasa Rao and S.V. Joshi,
- **D.Srinivasa Rao**, "*Detonation Spray Coatings*" in "Surface Engineering : Process Fundamentals and Applications", Lecture Notes of SERC School on Surface Engineering, Editors: D.Srinivasa Rao and S.V. Joshi, 2003 Chapter 4 pp:1-26

Co-editor:

A book titled "Surface Engineering : Process Fundamentals and Applications", Published by NAM S&T Centre, 2009, Editors: D.Srinivasa Rao and S.V. Joshi

Reports

- Development of Thermal Barrier Coatings Using Electron-Beam Physical Vapour Deposition Method, Part-I: Literature Review and Initial Characterization of Coatings
- Thermal Barrier Coatings Using Electron-Beam Physical Vapour Deposition Method, Part-II: Studying the effect of process parameters
- Review committee recommendations on Materials &Coatings for KMGT Engine
- Oversight Subcommittee recommendations on coatings for KMGT Engine
- *Detonation Gun Coating on LP Turbine Blades*”,T.R.No.ARCI/TR/9501,November,1995
- *Dynamic Ultra-Microhardness Tester*”,T.R.No.ARCI/TR/9601,January,1996
- *Detonation Coating Gun-Selected Case Studies* :T.R.No.ARCI/TR/002,Match,1994
- *Molybdenum Discs for Heavy-Duty-Electronic Applications-A novel P/M Product* ,T.R.No.ARCI/TR/004,1994
- *Experimental Design and Optimization of Coating Thickness in Detonation Coating Process*,
- Part-I: Coating of Tungsten Carbide-Cobalt Powder on Aluminium Substrate without manipulator. T.R.No.ARCI/TR/006, August, 1994
- *Experimental Design and Optimization of Coating Hardness in Detonation Coating Process*”,
Part-II : Coating of Tungsten Carbide-Cobalt Powder on Aluminium Substrate without manipulator. T.R.No.ARCI/TR/007, August, 1994
- *Experimental Design and Optimization of Coating Thickness in Detonation Coating Process*,
- Part-I :Coating of Tungsten Carbide-Cobalt Powder on Aluminium Substrate with manipulator. T.R.No.ARCI/TR/008, August, 1994
- *Experimental Design and Optimization of Coating Hardness in Detonation Coating Process*,
- Part-II :Coating of Tungsten Carbide-Cobalt Powder on Aluminium Substrate with manipulator. T.R.No.ARCI/TR/010, August, 1994
- *Characterization of SHS produced Powders Received from Isman*”, T.R.No.ARCI/TR/011, November 1994.
- *Installation, Commissioning and Application of a Detonation Coating Gun*, T.R.No.ARCI/TR/001, June 1992

Presentations at international and national conferences/workshops/seminars

- Detonation Sprayed Coatings using SHS powders, Indo-Belarus Workshop on Material Science and Metallurgy, November 15-16, 2012, Hyderabad.
- Technical Presentation on Thermal Cycling Behaviour of EBPVD Deposited TBC Coatings on NiCoCrAlY Bondcoats Obtained by DSC and APS Techniques, at International Conference and Exhibition on Heat Treatment and Surface Engineering, May 16-18, 2013
- Delivered a Lecture on Electron Beam Physical Vapour Deposition Technology , Surface Engineering Technologies : Research and Applications (SETRA), August 27-31, 2012
- Delivered a Lecture on Detonation Spray Coating Technology and its Application, Surface Engineering Technologies : Research and Applications (SETRA), August 27-31, 2012
- Lecture on Electron Beam Physical Vapour Deposition (EBPVD)” at the ARCI-MIAE meeting g (organized by DST) held at NOVOTEL, Hyderabad during 26-27 January 2011.
- Attended ITSC-2011 (International Thermal Spray Conference) Conference and Exhibition held at Singapore during 3rd-5th May, 2011.
- Co author of a paper presented on “Effect of bond coat surface roughness and thermally grown oxide layer on the microstructure and thermal cycling life of the EB-PVD TBC” at NMD, November,2011
- Several talks on “ Detonation Spray Coating Technology and Its applications in Power & Aerospace Sectors (For BHEL, HAL, SIEMENS and ABB ALSTOM)
- Co author of a paper presented on “Technology Commercialization: A Case Study” at the ‘R & D Management Conference on Managing the New Genre R & D: Indian Perspective’ organized by CSIR, New Delhi,Dec,08.
- Delivered a technical talk on “Surface Engineering ” at Vikram Sarabhai Space Centre, Trivandrum, India) 26th August, 2008
- Lecture on Detonation Spray Coating Technology and Applications”, at International Training Course And Business Opportunities Workshop On Surface Engineering, July 19-26, 2005, ARCI, Hyderabad, India
- Detonation Spray Coating Technology at SERC School on surface engineering, 19 July 2005
- Surface engineering for life extension of engineering components at national seminar advanced engineering materials organized by IEM, Hyderabad, 29 October 2004

- Detonation spray coating Technology and its applications, TDB review meeting, New Delhi, 10 August 2004
- Evaluation of detonation sprayed coatings bond strength at NTPC, New Delhi, and 14 July 2004
- Detonation Spray Coating Technology at SERC School on surface engineering, 16 July 2003
- Powders for surface engineering organized by PMAI at ARCI, 16 October 2003
- Issues in development of carbide based coatings using DSC technique at Indo-French Workshop, 25 November 2002
- Prospects of depositing carbide coatings by cold spray technique at 13th IFHTSE, USA on 8 October 2002
- Assessment of effect of binder in WC based coatings obtained by DSC, ASM International, Mumbai, March 2002
- Various aspects in coating of aeronautical components using DSC at HAL, Koraput, 18 December 2001
- Progress on ESC for enhanced performance of twist drills at IIT Chennai, 14 December 2001
- Powders for surface engineering organized by PMAI at ARCI, 7 November 2001
- Prospects of thermal spray coatings in fighter aircraft engine parts, Base Repair Depo-3, Chandigarh, 18 June 2001
- Influence of powder characteristics on properties of DSC sprayed Cr₃C₂-25NiCr coatings Engine Division, HAL, Bangalore on 11 May 2001
- Two technical lectures on Thermal Spray and DSC Technology at HAL, Koraput
- Refurbishment of aero-engineering components using Surface Coating Tehnologies, 19–20th June, 3 Base Repair Department, Chandigarh..
- Detonation spray coating technology transfer and its applications in aero-industry, 11th May-2001, HAL, Engine Division, Bangalore
- Protection and Refurbishment of aeroengine components using detonation spray and electro-spark coating techniques, presented in International seminar on Refurbishing of Gas Turbine components, 26-27th November 2000 at HAL, Sunabeda Orissa.
- *Prospective applications of thermal spray coatings for wear resistance of hydel components*, at first international conference on Silting Problems in Hydro Power Plants at New Delhi on 13-15th October, 1999
- *A techno-commercial feasibility of Detonation gun technology*, at Two-day seminar on Surface Engineering-99, January 1999. (Published in seminar souvenir)

- *A techno-commercial feasibility of Micro Arc Oxidation technology*, at Two-day seminar on Surface Engineering-99, January 1999. (Published in seminar souvenir)
- *Characterization and Application of Tungsten Carbide-Cobalt(92-8) Coatings Deposited by Electro-Spark Coating Technique*, Poster Session of 50th Annual Technical Meeting of IIM, AT New Delhi, 14-17th November, 1996
- *Tribological Behaviour of Detonation Gun Coatings*, at PM-97 International Conference on PM for Automotive Components, New Delhi, February 10-12 1997.
- *A techno-commercial feasibility of Detonation gun technology*, at Two-day seminar on Surface Engineering-99, January 1999. (Published in seminar souvenir)
- *A techno-commercial feasibility of Micro Arc Oxidation technology*, at Two-day seminar on Surface Engineering-99, January 1999. (Published in seminar souvenir)
- *Prospective applications of thermal spray coatings for wear resistance of hydel components*, at first international conference on Silting Problems in Hydro Power Plants at New Delhi on 13-15th October, 1999
- *Process parameter influence on thermo-mechanical properties of Alumina coated by Detonation Spray Coating (DSC) system*, at 37th NMD/53rd ATM organized by IIM at IIT Kanpur
- *The characterization of ultra-hard Alumina coatings obtained through Micro arc oxidation technique*, at 37th NMD/53rd ATM organized by IIM at IIT, Kanpur.
- Delivered a lecture on Detonation Gun & Electrospark Coating Technology at BHEL, Bhopal, 1997.
- Attended IAF base at Goa, to deliver a lecture on Detonation gun technology application on engine components of aircraft, September 1998.

Contact details

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