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Academic Background:

- B.Tech. (Metallurgical Engineering), IIT Bombay. (1991)
- Ph.D. (Materials Science), University of Alabama (1996)
- Post-Doctoral, Center for Ceramics Research, Rutgers University, USA (1997 - 1998)

Interests:

- Powder Processing
- Near Net Shape Forming of Advanced Ceramics
- Gel casting
- Rapid prototyping
- Rheology of Suspensions
- Indentation Cracking of Ceramics
- Ceramic composites
- Quantitative microscopy

Patents:

- “Highly porous ceramic or metallic material and simple environment friendly process for fabrication of the same,” MamataPradhan and ParagBhargava (Indian Patent No. 206908 dt. 8/9/2003)
- “A composition for consolidation of dense ceramics compacts,” SantanuDhara, DipankarGhosh and ParagBhargava (Indian Patent No. 218562 dt. 10/09/2003)
- “A composition for forming porous bodies in particular, ceramic and metal foams, and a process for the preparation thereof”, SantanuDhara, MamataPradhan and ParagBhargava (Indian Patent No. 203231 dt. 27/5/2002)
- “A composition for use in gelation forming of ceramics and a process for the preparation thereof” SantanuDhara and ParagBhargava (Indian Patent No. 198819 dt. 24/10/2000)
- New technology: Process for making highly porous ceramics (ceramic foams) with porosity exceeding 95 %, Protein coagulation casting of ceramics (use of proteins in gelcasting of ceramics)

Selected Publications:

- “Effect of sucrose on fabrication of ceramic foams from aqueous slurries.” MamataPradhan, ParagBhargava, Journal of American Ceramic Society Vol. 88 (1) 216 (2005)
- “Influence of Nature and Amount of Dispersant on Rheology of Aged Aqueous Alumina Gelcasting Slurries” S. Dhara and P. Bhargava, Journal of Am. Ceram. Soc. 88(3), 547-552 (2005)
- “Machining Behaviour of Green Gelcast Ceramics,” R. K. Kamboj, S. Dhara and P. Bhargava, J. Eur. Ceram. Soc. 23(7), 1005-1011 (2003)
- “Shape Forming of Ceramics via Gelcasting of Aqueous Particulate Slurries,” S. Dhara, R. K. Kamboj, M. Pradhan and P. Bhargava, Bull. Mater. Sci. 25(6), 565-568 (2002)
- “Quantitative Characterization of Indentation Crack Path in c-ZrO₂/10 v% Al₂O₃ Composite.” P. Bhargava and B. R. Patterson, J. Am. Ceram. Soc. 80(7), 1863-1867 (1997)

Awards

- Excellence in Teaching Award, IIT Bombay (2008)
- First Prize, Inter-IIT competition on, “New environments for learning, teaching, research, creation, use and preservation of digital resources”, Pan-IIT meet Mumbai (2006)
- Silver medal: Tech. based commercializable innovation at Incubiz (Anveshan 05) organized by IIM Ahmedabad (05)
- Young Engineer of the Year (2002) award from the Indian National Academy of Engineering (INAE)

Representative journal articles:

- “A simple direct casting route to ceramic foams”, SantanuDhara and ParagBhargava, Journal of American Ceramic Society, 86 [10] 1645 – 50 (2003)
- “Egg White as an Environmentally Friendly Low-Cost Binder for Gelcasting of Ceramics,” S. Dhara and P. Bhargava, J. Am. Ceram. Soc., 84 [12] 3048-50 (2001)
- “Quantitative characterization of indentation crack path in c-ZrO₂/10 v% Al₂O₃ composite,” ParagBhargava and B.R. Patterson, J. Am. Ceram. Soc., 80 [7] 1863-67 (1997)
- “Effect of sucrose on fabrication of ceramic foams from aqueous slurries”, MamataPradhan, ParagBhargava, Journal of American Ceramic Society Vol. 88 (1) 216 (2005)

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Academic Background:

- Ph.D. : The State University of New York/SUNY Buffalo, USA
- Post-Doctoral, School of Engineering and Applied Sciences Harvard University, Cambridge, Massachusetts, USA.

Interests:

- Nanophotonic devices
- Nanomaterials
- Metamaterials
- Plasmonic devices

Selected Publications:

- “Subwavelength direct laser patterning of conductive gold nanostructures by simultaneous photo-polymerization and photo-reduction” Shobha Shukla, Xavier Vidal, Edward P Furlani, Mark T Swihart, K-T Kim, Y K Yoon, Augustine Urbas, Paras N Prasad; ACS Nano, 2011, 5 (3), pp1947–1957; Highlighted in ACS Nano March 2011 Podcast ([link](#)); Also highlighted in PERSPECTIVE of same issue “Direct Writing of Metal Nanostructures: Lithographic Tools for Nanoplasmonics Research”
- “Two-Photon Lithography of Sub-Wavelength Metallic Structures in a Polymer Matrix” Shobha Shukla, Edward P Furlani, Xavier Vidal, Mark T. Swihart, Paras N. Prasad; Advanced Materials, 2010, 22 (33), pp3695-3699.
- “Fabrication and characterization of gold-polymer nanocomposite plasmonic nanoarrays in porous alumina template” Shobha Shukla, K T Kim, A Baev, Y K Yoon, P N Prasad; ACS Nano 2010, 4 (4), pp 2249–2255.
- “Control of spontaneous emission of CdSe nanorods in a multi-refractive triangular lattice photonic crystal” Shobha Shukla, Rajiv Kumar, Alexander Baev, P N Prasad; Journal of Physical Chemistry-Letters, 2010, 1 (9), pp 1437– 1441.
- “Efficient polymeric nanocomposite photodetectors from simple mixture of IR active quantum dots and carbon nanotube” S Shukla, T Ohulchanskyy, Y Sahoo, M Samoc, R Thapa, A Cartwright, P N Prasad; Journal of Physical Chemistry C, 2010, 114 (7), pp 3180–3184.
- “Femtosecond laser assisted fabrication of 3D metallic nanostructures through photoreduction” Kevin Vora, S Kang, Shobha Shukla, Eric Mazur; Applied Physics Letters, (Under peer review)

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Academic Background:

- Ph.D, Indian Institute of Science, Bangalore, India in 2004
- M.S, Calcutta University, India in 1997
- B.S, Calcutta University, India in 1995

Research Interest:

- Nanostructured Materials-synthesis, organization and integration
- Lithium ion Batteries, Hybrid Vehicles
- Na-ion and Magnesium ion batteries
- Electrochemical Energy Storage
- Electrochemistry of Semiconductors, Cu interconnect metallization process

Courses Offered:

- Introduction to Energy System Engineering
- Thermodynamics and Energy Conversion
- Electrochemistry
- Chemistry for Energy Science
- Electrochemistry of Fuel cells

List of Publications:

1. Patent: "POSITIVE ELECTRODE FOR AN ENERGY STORAGE DEVICE AND A PROCESS FOR MAKING THE SAME" Sudeep Sarkar, Sagar Mitra File. No.:82/MUM/2013 (INDIAN PATENT)
2. Improved electrochemical activity of nanostructured Li₂FeSiO₄/MWCNTs composite cathode; Shivani Singh and Sagar Mitra, *Electrochimica Acta*, in press (Jan 2014)
3. Tin Sulfide (SnS) Nanorods: Structural, Optical and Lithium Storage Property Study: Alok M Tripathi and Sagar Mitra, *RSC Advances*, (in press) Dec 2013.
4. Electrodeposition of Iron Phosphide on Copper Substrate as Conversion Negative Electrode for Lithium-ion; M.S. Chandrasekar and Sagar Mitra, *Ionics*, in press (Nov) 2013.
5. Phase Transition, Electrochemistry, and Structural Studies of High Rate LiV₃O₈ Cathode with Nanoplate Morphology” by S. Sarkar, Arghya Bhowmik, Mridula Dixit Bharadwaj and S. Mitra *J. Electrochem. Soc.*, in press, Oct. 2013
6. Nickel Ferrite as Stable, High Capacity and High rate Anode for Li-ion Battery Applications Ramesh K Petla and Sagar Mitra, *RSC Adv.* (Sept 2013, in press), DOI: 10.1039/c3ra44001j.
7. Green Template-Free Synthesis of SnO₂ Nano Sphere- A Physical Understanding and Electrochemistry Alokmani Tripathi and Sagar Mitra, *RSC Advances*, in press, August, 2013.
8. Enhanced High Rate Performance of Alpha- Fe₂O₃ Nanotubes with Alginate Binder as Conversion Anode; Pavan Veluri and Sagar Mitra, *RSC Advances* (in press) June 2013.
9. Li₂MnO₃ Rich-LiMn_{0.33}Ni_{0.33}Co_{0.33}O₂ integrated nano-composites as High Energy Density Lithium-ion Battery Cathode Materials Senthilkumar Rajarathinam; Sagar Mitra and Ramesh K Petla, *Electrochimica Acta*, (in press) June 2013.
10. Nano Dimensionality: A Way Towards Better Li-Ion Storage ;Uttam Kumar Sen, Sudeep Sarkar, Pavan Srinivas Veluri, Shivani, Sagar Mitra *Nanoscience and Nanotechnology Asia*, (in press) 2013. (invited review)
11. A way to IDENTIFY ARCHAELLINS IN HALOBACTERIUM SALINARUM ARCHAELLA BY FLAG-TAGGING; Sergei N. Beznosov, Michael G. Pyatibratov, Pavan Srinivas Veluri, Sagar Mitra, and Oleg V. Fedorov; *Central European Journal of Biology* -2013 (in press)
12. High Capacity Lithium-ion Battery Cathodes using LiV₃O₈ Nano-rods; Sudeep Sarkar, Harish Banda, Sagar Mitra; *Electrochimica Acta* 2013, Volume 99, 242 - 252
13. High Rate and High Energy Density Lithium-ion Battery Anode Containing 2-D MoS₂ Nano-wall and Cellulose Binder; Uttam Kumar Sen, Sagar Mitra; *ACS Appl. Mater. Interfaces*, 2013, 5(4), 1240-1247.

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Academic Background:

- B.Tech. (Electrical Engineering), Nagarjuna University (2000)
- M.Tech (Energy System Engineering), IIT Bombay (2002)
- Ph.D. (Power Systems), IIT Delhi (2007)

Interests:

- Smartgrids
- Microgrids
- Converter topologies and control
- Communication protocol for power systems
- Grid integration of distributed energy resources
- Power systems operation and control
- Energy efficiency

Honors and Awards:

- "Young Faculty Award" IIT Bombay, 2009
- "MHRD Fellowship" to conduct research at IIT Delhi (2004-2006)
- "MHRD Fellowship" for M.Tech Programme at IIT Bombay during the 2000-2002 academic year

Recent Publications

- ayesh Priolkar and S. Doolla " Analysis of PV-Hydro Isolated Power Systems "Presented at IEEE INDICON , to be held in Mumbai, December 13-15, 2013
- H.S.V.S. Kumar Nunna and S. Doolla "Intelligent Demand Side Management in Smart-Microgrids", Presented at 2013 IEEE International Workshop on Intelligent Energy Systems (IWIES 2013) to be held in Vienna, November 14, 2013
- Vijay. A.S, S. Doolla and M. C. Chandorkar "Voltage Sag Emulation using Power Electronic Converters: IECON 2013 ", Presented at IEEE Industrial Electronics Conference, to be held in Vienna, November 10-13, 2013
- H.S.V.S. Kumar Nunna, S. Doolla and A. Shukla " Multi-Agent Application for Demand Response in Microgrids ", Presented at IEEE Industrial Electronics Conference, to be held in Vienna, November 10-13, 2013
- V. K. Mourya, A. Shukla and S. Doolla " Control of grid connected Cascaded H-Bridge Multilevel Converter during grid voltage unbalance for Photovoltaic application" Presented at IEEE Industrial Electronics Conference, to be held in Vienna, November 10-13, 2013
- Nimish Soni, S. Doolla, and M. C. Chandorkar "Improvement of Transient Response in Microgrids using Virtual Inertia", IEEE Trans. on Power Delivery, Vol. 28, No. 3, July 2013, pp. 1830-1839
- H.S.V.S. Kumar Nunna and S. Doolla, "Energy Management in Microgrids using Demand Response and Distributed Storage- A Multi-Agent Approach", IEEE Trans. on Power Delivery, Vol. 28(2), April 2013, pp. 939-947
- H.S.V.S. Kumar Nunna and S. Doolla, "Multi Agent based Distributed Energy Resource Management for Intelligent Microgrids", IEEE Trans. on Industrial Electronics, Vol. 60 (4), 2013 pp. 1678-87.
- Aravind Kumar, K., Doolla, S., and Banerjee, R., "**Sizing of isolated hybrid renewable power system with Demand Side Management.**" In Proceedings of the International Conference on Energy Resources and Technologies for Sustainable Development (ICERTSD 2013) Howrah, West Bengal, February 7-9, 2013.

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Academic Background:

- M.Sc. (Physics), Jai Narayan Vyas University, Jodhpur (2001)
- M.Tech. (Laser Science & Applications), Devi Ahilya University, Indore(2003)
- Ph.D. (Physics), JNCASR, (2007)
- Post-Doctoral Fellow, OE group Cavendish Laboratory (2007 - 2009)

Interests:

- Molecular semiconductors: charge transport and photophysics
- Advanced spectroscopy/microscopic characterizations
- Organic electroluminescence
- Organic photovoltaics
- Organic semiconductors based lasers
- Hybrid approach: good of both
- Interfacial dynamics of organic/inorganic semiconductors
- Nanocomposite thin film devices/sensors
- Nanostructured oxides: photonic designs

Patents:

- “ELECTRO-OPTIC DIODE DEVICES” This invention relates to electro-optic diode devices, and especially but not exclusively to high efficiency electro-optic diode devices having polymer and metal oxide components. Dinesh Kabra, Myoung Hoon Song, Bernard Wenger, Richard H. Friend and Henry J. Snaith, 2008. (WO 2009 153328 A1) (CE ref. Fri-2136-08) EP AND US GRANTED, JP, KR & CN patent applications pending (LICENSED BY CDT, UK for the development of flexible active matrix display)
- “Thick Polymer/Organic Diodes”: This invention relates to absolute use of interface engineering to fabricate micron thick polymer devices with high power efficiency. Dinesh Kabra, Myoung Hoon Song, Liping Lu, Richard H. Friend and Henry J. Snaith, 2009 (WO 2011 0863372 A1) CE ref. Fri-2354-09) – PCT application still pending, national/regional patent applications not yet filed
- Photovoltaic Device: This invention relates to modification of electron extracting electrode by a self assemble monolayer, which provides enhanced exciton dissociation and prevents back recombination of photogenerated carriers, which has got direct implications in resolving an important issue for improved performance for organic and dye sensitized solar cells. Dinesh Kabra, Y. Vaynzof, Lihong Zhao, P. K. Ho, R. H. Friend, 2010 (Filing No. GB 1006820.3)

Selected Publications:

- “Barium Hydroxide as an Interlayer Between Zinc Oxide and Luminescent Conjugated Polymer for Light Emitting Diodes” L. P. Lu, Dinesh Kabra (corresponding author) and R. H. Friend *Adv. Func. Mater.* Vol. 22, p-4165 (2012) Impact factor: 10.2
- “Highly Efficient Single-Layer Polymer Ambipolar Light-Emitting Field-Effect Transistors” M. Gwinner, Dinesh Kabra, M. Roberts, T. J. K. Berner, B. H. Wallikewitz, R. H. Friend and H. Sirringhaus, *Adv. Mater.* Vol. 24, pp- 2728 (2012) Cited:2 Impact factor: 13.9
- “Charge Carrier Balance and Colour Purity in Polyfluorene Blends for Efficient Hybrid Blue Light Emitting Diode” L. P. Lu, Dinesh Kabra (corresponding author), K. Johnson, R. H. Friend *Adv. Func. Mater.* Vol. 22, p-144 (2012) Cited:3 Impact factor: 10.2
- “Collective osmotic shock in ordered materials” Paul Z. Rivera, K. Channon, V. Nyugen, E. Sivaniah, S.K. Nataraja, Dinesh Kabra, R. H. Friend, S. A. Al-Muhtaseb, A. Hexemer, M. Calvoe, H. Miguez *Nature Materials* Vol. 11, pp- 53 (2012) Cited:9 Impact factor: 32.8
- “Time-Resolved, Spectroscopic Investigation of Triplet Dynamics in a Fluorescent Polymer Light-Emitting Diodes”, B. H. Wallikewitz, Dinesh Kabra, S. Gelin, and R. H. Friend *Phys. Rev. B* Vol. 85, pp-45209 (2012) Cited:3 Impact factor: 3.8
- “Optically-Pumped Lasing in Hybrid Organic-Inorganic Light Emitting Diodes” M. H. Song, Dinesh Kabra, B. Wenger, R. H. Friend and H. J. Snaith *Adv. Func. Mater.* Vol 19, pp- 2130, (2009) Cited: 22 Impact factor: 10.2
- “Direct Estimation of Transport Length Scales in Semiconducting Polymers” D. Kabra and K. S. Narayan *Advanced Materials* Vol 19, pp-1465 (2007) Cited:12 Impact factor: 13.9

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Academic Background:

- M.Tech., IIT Bombay. (2004)
- Ph.D., University of Texas Alabama (2009)
- Post-Doctoral, Lawrence Berkeley National Laboratory, CA, USA, (2009-2011)

Interests:

- **Fuel cells:** Proton exchange membrane fuel cells (PEMFC), Direct methanol fuel cells (DMFC), Alkaline fuel cells (AFC), Electrocatalyst synthesis and characterizations, Structure-property evaluation of electrocatalysts, Design of electrocatalysts.
- **Nanomaterials:** Metal nanoparticles synthesis and characterization, “Core-Shell” structures,
- **Electrochemistry:** Electrochemical engineering, Analytical electrochemistry, Electro-synthesis, Electrochemical tools for material characterizations.

Selected Publications:

- [“Sarkar, A., Tirumkudulu, M.S. , **Ultimate strength of a colloidal packing**”](#), *Soft Matter*, vol. 8, issue 2, pp. 303 - 306, 2012
- [Sarkar, A., Tirumkudulu, M.S. , **Ultimate strength of a colloidal packing**”](#), *Soft Matter*, vol. 8, pp. 303-306, 2012.
- [Sarkar, A., Tirumkudulu, M.S. , **Delamination of drying nanoparticle suspensions**”](#), *Soft Matter*, vol. 7, issue 19, pp. 8816 - 8822, 2011
- [Sarkar, A., Tirumkudulu, M.S. , **Asymptotic analysis of stresses near a crack tip in a two-dimensional colloidal packing saturated with liquid**”](#), *Physical Review E*, vol. 83, pp. 10, 2011.
- [Sarkar, D., Tikku, S., Thapar, V., Srinivasa, R.S., Khilar, K.C. , **Formation of zinc oxide nanoparticles of different shapes in water-in-oil microemulsion**”](#), *Colloids and Surfaces a-Physicochemical and Engineering Aspects*, vol. 381, pp. 123-129, 2011.
- [Pal, S., Sarkar, U., Dasgupta, D. , **Dynamic simulation of secondary treatment processes using trickling filters in a sewage treatment works in Howrah, west Bengal, India**”](#), *Desalination*, vol. 253, issue 1-3, pp. 135 - 140, 2010
- [Keswani, R.K., Ghodke, H., Sarkar, D., Khilar, K.C., Srinivasa, R.S. , **Room temperature synthesis of titanium dioxide nanoparticles of different phases in water in oil microemulsion**”](#), *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, vol. 369, issue 1-3, pp. 75 - 81, 2010
- [Sarkar, A., Tirumkudulu, M.S. , **Consolidation of charged colloids during drying**”](#), *Langmuir*, vol. 25, issue 9, pp. 4945 - 4953, 2009
- [Khakhar, D.V., Sarkar, S. , **Dense granular flows: Rheology and segregation**”](#), *AIP Conference Proceedings*, vol. 1027, pp. 938 - 940, 2008
- [Sarkar, S., Khakhar, D.V. , **Experimental evidence for a description of granular segregation in terms of the effective temperature**”](#), *Europhysics Letters*, vol. 83, issue 5, 2008

Awards

- Recipient of the Ramanujan Fellowship, Government of India, 2011.
- Recipient of the University of Texas at Austin Pre-emptive Fellowship, University of Texas at Austin, 2005-2006.
- Recipient of National Renewable Energy Fellowship, Govt. of India, 2002

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Academic Background:

- B.Tech. (ECE), National Institute of Technology Calicut. (2002)
- M.Tech (EE), Indian Institute of Technology Bombay (2004)
- Ph.D. School of ECE, Purdue University, West Lafayette, IN, USA (2009)
- Post-Doctoral, School of ECE, Purdue University, (2009-2011)

Interests:

- **Nanoscale devices for energy conversion.** Current projects address various issues related to Organic Solar cells, Dye sensitized solar cells, optics of nanostructured devices, etc.
- **Nanoscale devices for Healthcare applications.** Current projects include design and optimization of novel nanoscale electronic biosensors for better sensitivity, faster response time, and better selectivity (for both in vivo and in vitro applications).
- **Semiconductor device physics and reliability.** Modeling and simulation of Organic electronic (e.g., OFET) and optoelectronic devices (e.g., OLED). We also look into reliability aspects of semiconductor devices (e.g., NBTI).
- **Nanoelectromechanical systems (NEMS).** NEMS based bio/chemical sensors, switches, and energy conversion devices

Selected Publications:

- “On the validity of unintentional doping densities extracted using Mott Schottky analysis for thin film organic devices,” A. Nigam, M. Premaratne, and P. R. Nair, *Organic Electronics*, accepted (2013).
- “Investigation of effect of ionizing radiation exposure on material properties of organic semiconducting oligomer - Pentacene,” H. N. Raval, D. S. Sutar, P. R. Nair and V. R. Rao, *Organic Electronics*, 14,1467-1476 (2013).
- “A compact analytical formalism for current transients in electrochemical systems”, P. R. Nair and M. A. Alam, *Analyst* 138, 525, (2013).
- “Theory of signal and noise in double-gated nanoscale electronic pH sensors”, J. Go, P. R. Nair, and M. A. Alam, *Journal of Applied Physics*, (2012).
- “Coupled Heterogeneous Nanowire–Nanoplate Planar Transistor Sensors for Giant (>10 V/pH) Nernst Response”, J. Go, P. R. Nair, B. Reddy, B. Dorvel, R. Bashir, and M. A. Alam, *ACS Nano*, (2012).
- “Flexure FET biosensors to break the fundamental sensitivity limits of nanobiosensors using nonlinear electromechanical coupling”, A. Jain, P. R. Nair, and M. A. Alam, *Proceedings of the National Academy of Sciences (PNAS) USA*, (2012).
- “Prospects of Nanowire-Doped Polycrystalline Graphene Films for an Ultratransparent, High Conductive Electrode”, C. Jeong, P. R. Nair, M. Khan, M. Lundstrom, and M. A. Alam, *Nanoletters*, (2011).
- “Strategies for Dynamic Soft-Landing in Capacitive Microelectromechanical Switches”, A. Jain, P. R. Nair, and M. A. Alam, *Applied Physics Letters*, 98, 234104, (2011).
- “Annealing Dependent Performance of Organic Bulk-Heterojunction Solar Cells: A Theoretical Perspective”, B. Ray, P. R. Nair, and M. Alam, *Solar Energy Materials and Solar Cells*, (2011).
- “Silicon Field Effect Transistors as Dual-Use Sensor-Heater Hybrids,” B. Reddy, O. Elibol, P. R. Nair, B. Dorvel, F. Butler, Z. Ahsan, D. Bergstrom, M. A. Alam, and R. Bashir, *Analytical Chemistry*, (2011).
- “High-k dielectric Al₂O₃ nanowire and nanoplate field effect sensors for improved pH sensing,” B. Reddy, B. Dorvel, J. Go, P. R. Nair, O. Elibol, C. Credo, J. Daniels, E. Chow, X. Su, M. Varma, M. A. Alam, and R. Bashir, *Biomedical Microdevices*, (2011).
- “Theoretical Detection Limits of Magnetic Biobarcode Sensors and the Phase Space of Nanobiosensing”, P. R. Nair and M. A. Alam, *Analyst*, vol. 135, pp. 2798 (2010).
- “Kinetics of Surfaces Defined by Finite Fractals”, P. R. Nair and M. A. Alam, *Fractals*, vol. 4, pp. 461 (2010)

Awards

- Outstanding Dissertation Award: Dimitris N. Chorafas Foundation, 2009.
- Outstanding Dissertation Award: School of ECE, Purdue University, 2009.