Employment Experience

Nature of Experience	University/Organization	Employment status	Period
Teaching	I.I.T. Kharagpur	Faculty	03.04.84 to 30.09.2016
PDF	I.I.T. Kharagpur		April 83 to April 84
Visiting Scientist	Calcutta University	Research	April 82 to April 83
PDF	I.I.T. Madras	Research	October 81 to April 82
Faculty-in-training, PDF	University of Wisconsin, Madison, USA	Teaching, Research	March 1978 to October 1981

“Education is what is left when one forgets all he or she has learned”. I train a student’s mind to think while the student teaches him/herself the subject. I build the “fishing skill” of the students rather than simply feeding the students with the “fish”.

I teach both from engineering point of view (problem solving) and also as liberal arts subject. The first wine cup made using nano-gold was made over 4500 years ago when science was unknown and craftsmen relied on their sensory perceptions., It is only now we are re-inventing the wheel in a scientific way, I try to mold students so that they become:

1. Effective Communicators
2. Critical and creative thinkers
3. Self-learners and lifelong learners
4. Problem solvers
5. Wise decision makers
6. Contributing members of society with an awareness of social, economic, cultural and environmental issues
7. Think beyond the horizon and work on it

The whole art of teaching is only the art of awakening the natural curiosity of young minds.--Anatole France

“Education is what is left when one forgot all he or she has learned”. It is true that education is the process of shaping the way of thinking. My teaching philosophy is simply “teaching is always not enough”. I don’t over stuff the students with anything. My job is to teach them to learn the how, where and what to learn – A teacher in an engineering Institute should train a student’s mind while he teaches himself the subject. Teaching is to build the “fishing skill” of the students rather than simply feeding the students with the “fish”.

I try to cultivate an appreciation for the historical and social context of technology, as a human endeavor. I tell students that the electronic digital computer is a great achievement of civilization, comparable to the plays of Shakespeare, the paintings of Rembrandt, and the symphonies of Beethoven. In a sense, I teach engineering not only as a professional discipline, but also as one of the liberal arts.

I am currently working on:

- ➔ Nano-ceramics and nano-composites for structural and electronic applications
- ➔ Bio-compatible bioresorbable ceramics for bone and muscle regeneration and targeted drug delivery

My past work at IIT Kharagpur has centered on:

- ✓ Color generation and control in Se containing glasses
- ✓ Development of ceramic tapes for nuclear radiation sensing to be used as personnel monitor
- ✓ Development of Y-Ba-Cu-O superconductor, tapes, thin films
- ✓ Synthesis of nano sized powders and whiskers of Y-Ba-Cu-O,
- ✓ Synthesis of nano sized powders and whiskers of SiC and Si_3N_4 for drug delivery
- ✓ Giant magnetoresistive materials
- ✓ High k dielectrics as diffusion barrier and dielectric on Silicon substrates for device application
- ✓ Shape memory alloys for medical (stent) and apparel applications
- ✓ Laser ablated deposition ceramics on silicon for device application
- ✓ Refractories, thermal barriers, waste recycling of refractories
- ✓ Improving strength of polymers by incorporation of nano sized ceramic powders using blending and solution polymerization growth technique
- ✓ Hard facing of glass surfaces
- ✓ High strength ceramic armor materials
- ✓ Sensors for strategic applications
- ✓ Shape memory materials for biomedical applications
- ✓ Refractory materials and coatings for thermal barrier and tribology applications in (a) space (b) aerospace, (c) heavy engineering industry and (d) automotive industry

Teaching experience:

Ceramic fabrication and processing
Ceramic technology
Materials Science
Ceramics for electronic applications
Structure-property relations in materials
Thin film technology
Glass Technology
Refractories and thermal barriers
Spectroscopy of glasses
Techniques of materials characterization
Sensor materials and sensor technology
Photonics

Processes developed/patents /technology transferred:

- Synthesis of nanometer sized powders of Magnesium Aluminate: patent ref. no. 883/Cal/95 of 31.7.95, Patent No.183766: Technology transferred to M/S Associated Cement Co. India for nano-sized magnesium aluminate to used as refractory binders
- Synthesis of nanometer sized powders of alumina, barium and strontium titanates, lanthanum aluminate and PLZT: patent ref. no. 884/Cal/95 of 31.7.95 Patent No.183767
- A process of coating glass fibre mats with BN using polymer precursors: A process developed for secondary aluminum refining industry
- A new method for determination of durability of silicate glasses with late Prof. A. Paul in 1984 (the first alternative process to be developed in the last 100 years as per M/S Cookson, U. K.)
- Coating of polyimide films by thin films of metals for use in space: technology developed for Indian Space Research Organization
- Extraction of high purity (> 99.9 %) ZrO_2 from zircon sand - work done for M/S Tata Iron & Steel Co. Ltd., India
- Hard facing of polyimide films for application as heat shield of satellites in space: technology demonstrated to ISRO and process developed by ISRO for application

Projects executed

- Synthesis, Characterization and Fabrication of High Temperature Ceramic Superconductors; 1988 to 1991, sponsored by Council of Scientific and Industrial Research; Rs 10 lakhs
- Fabrication of Thin Films of HTCS and Study of Device Possibilities; 1988 to 1996, sponsored by Department of Science and Technology: Rs. 3 crores
- Synthesis of Nanosized Ceramics and Study of Sintering behavior; 1994 to1997, sponsored by Department of Science and Technology; Rs. 25 lakhs
- Synthesis of nano-sized AlN powders 1997 to 2000, sponsored by All Indian Council of Technical Education, Rs. 10 lakhs
- Synthesis of ultra-fine BN powders 1998 to 2001, sponsored by Ministry of Human Resource and Development, Rs. 10 lakhs
- Fabrication of multi-layer ultra-thin coatings for abrasion resistance and electronic applications; 2002 to 2007 sponsored by DRDO Rs. 3.5 crores

Publication list

01	Debasis Bhattacharya, John E. Willard	Spectra, yields, and photolability of cations, carbanions, radicals, and scavenger anions in .gamma.-irradiated alkane glasses	*J. Phys. Chem.*, *84* (2), pp 146–155	1980
02	H. F. Fenrick, D. Bhattacharya, J. E. Willard	Reactions of hydrogen atoms with dissolved alkanes, oxygen, and carbon monoxide in xenon matrixes at 4-50 K	J. Phys. Chem., 85 (10), pp 1324–1326	1981
03	Debasis Bhattacharya, Hsien-Yien Wang, John E. Willard	Trapped hydrogen atoms, deuterium atoms, and methyl radicals in methane and methane-d4 at 5-50 K. Yields from photolysis of HX and from radiolysis; decay mechanisms; reactions with oxygen and carbon monoxide	J. Phys. Chem., 85 (10), pp 1310–1323	1981
04	Debasis Bhatacharya and John E Willard	Radiolytic production of trapped hydrogen atoms from organic compounds in xenon, krypton, and argon at 10 K	The Journal of Physical Chemistry 85(2), 154 - 159	1981
05	Debasis Bhattacharya, John E. Willard	Photoelimination of hydrogen atom from radicals in methane and xenon matrixes. Photodecomposition of CH_3O_2	J. Phys. Chem., 86 (6), pp 962–966	1982
06	Debasis Bhattacharya, John E. Willard	Reactions of methylene with methylene and methyl in methane and xenon matrices	*J. Phys. Chem.*, *86* (6), pp 967–970	1982
07	D Bhattacharya, S Maiti, P. Pramanik, T K Dey, S S K Ghatak,S C Kashyap, D K Pandya and K L Chopra	Structural and Electrical Properties of Screen Printed Thick Films of YBa2Cu3O7-x Superconductors	Thin Solid Films, 164, 115	1988
08	D Bhattacharya, S K Ghatak, T K Dey, P Pramanik, D K Bhatnagar, S C. Pandya and K L. Chopra	Superconductivity in the sulphur doped Y-Ba-Cu-O system	Solid State Commun., 66, 961	1988
09	T K Dey, D Bhattacharya, S K Ghatak, P Pramanik and K L Chopra	Critical Current Density of $YBa_2Cu_3O_{7-x}$ Sintered pellets under transverse magnetic fields	Solid State Commun. 68, 635	1988
10	P Pramanik, Biswas, Singh, Bhattacharya, Dey,D. Sen, S K Ghatak and K L Chopra	Copreciptiation method for preparation of superconducting compounds $YBa_2Cu_3O_x$	Mat.Res.Bull., 23, 1693	1988
11	P. Pramanik, B K Raul, Chakrabarty, T K Dey, S Srinivasan, S K Ghatak, D Bhattacharya and K L	Structural and elctrical properties of screen printed and spray pyrolysed high temperature superconducting film	Science and Technology of Thin Film Superconductors"	1988

	ChopraS K		,eds. McConnell and Wolf, pp 309	
12	P Pramanik, B K Raul, Chakrabarty, Biswas, D Bhattacharya and K L. Chopra	Coprecipitation route to ceramic superconductors	High Temperature Superconductors, ed. Narlikar, Vol 2, p241	1989
13	T K Dey, S K Ghatak, S Srinivasan, D Bhattacharya and K L Chopra	Thermoelectric power of doped and undoped Y-Ba-Cu-O Superconductors between 77 K and 300K	Solid State Commun, 72, 525	1989
14	T K Dey, Radha , Barik, D Bhattacharya and K L Chopra	Excess electrical conductivity and thermoelectric power of [YBa2Cu3.05Ox]-Agn pellets	Solid State Commun., 74, 1315	1990
15	D. Bhattacharya, L.C.Pathak, S.K.Mshra, D.Sen and K.L.Chopra	Pyrophoric synthesis technique for multicomponent high-temperature superconductors	Appl. Phys. Lett .57, 2145-2147	1990
10	D.Bhattacharya, D.K.Pandya, S.C.Kasyap, L.C.Pathak, S.Mishra, D.Sen and K.L.Chopra,	Lattice and electronic structure of YBa_2Cu_2PbOx superconductor,	Physica C 170 p245-248	1990
16	D Bhattacharya, P Pramanik, S C Kashyap, Gogia, D Bhatnagar, D K Pandya and K. L. Chopra	Effect of additives on the structure and superconducting properties of YBCO:Ag_x and BSCCO:Pb_x superconductors	International Conference on Superconductivity ,ICSC, eds, Joshi, Rao and Subramanyam, World Scientific, pp 86	1990
17	D Bhattacharya, D K Pandya, S C Kashyap, L C Pathak, S K Mishra, D Sen, and K L Chopra	Lattice structure and electronic properties of $YBa_2Cu_2PbO_x$ superconductors,	Physica C, 170, 245	1990
18	D Sen, D Bhattacharya, S K Ghatak and K L. Chopra	Magnetic and microstructural properties of $YBa_2Cu_3O_x$-Ag_n Composite	Bull. Materials Sci. 14, 927	1991
19	D. Sen, S K Ghatak, K L Chopra, Markendyaulu and D Bhattacharya,	Electromagnetic Response of Superconducting YBaCuO-Ag Composite in the R.F. region	Solid State Commun., 79, 935	1991
20	D Sen, S K Ghatak, K L Chopra and D Bhattacharya,	Critical Current Density and Magnetic Behaviour of Superconducting $YBa_2Cu^{3+}{}_{yO7-z}$:Ag Composite	J. Phys. Cond. Matter, 3, 1181	1991
21	S.K.Mshra, L.C.Pathak, S.K.Ray, S.Kal, D.Bhattacharya, S.K.Lahiri, and K.L.Chopra	Lithographic patterning of superconducting YBCO films	J. Supercond. 5 445-449	1992

22	S.K.Mishra, L.C.Pathak, M.V.H.Rao, D.Bhattacharya and K.L.Chopra	Dependence of the properties of rf magnetron sputtered superconducting films on plasma parameters	Ind. J. Pure Appl. Phys. 30 p685-691	1992
23	S.K.Mishra, A.Sarkar, S.K.Ray, L.C.Pathak, D.Bhattacharya, K.L.Chopra and S.R.Das	Langmuir probe diagnostics of a radio frequency magnetron discharge for deposition of high T_c YBCO films	J. Vac. Sci. Technol. A 11 p2747-2751 & Errata 12 (1994) p603	1993
24	M.V.H.Rao, S.K.Mishra, L.C.Pathak, B.K.Mathur, D.Bhattacharya and K.L.Chopra,	Interlocked grain growth of YBCO film on magnesium oxide as observed by scanning tunnelling microscopy	Mater. Res. Bull. 28 p271-277	1993
25	L.C.Pathak, S.K.Mishra, P.G.Mukunda, M.M.Godkhindi, D.Bhattacharya and K.L.Chopra,	Sintering studies on submicrometre sized Y-Ba-Cu-oxide powder	J. Mater. Sci. 29 p5455-5461	1994
26	S.K.Ray, S.K.Mishra, A. Sarkar, A.Dhar, D. Bhattacharya and K.L Chopra,	Molecular Beam Epitaxial growth of high Tc Bi-Sr-Ca-Cu-O film,	J. Superconduc. ,8 (3) , 377-381	1995
27	L.C.Pathak, S.K.Mishra, D.Bhattacharya and K.L.Chopra,	Fabrication of $YBa_2Cu_3O_x$ single crystal	J. Mater. Sci. Lett. 15 p34-35	1996
28	L.C.Pathak, S.K.Mishra, D.Bhattacharya and K.L.Chopra	Fabrication and characterisation of Y-Ba-Cu-oxide whisker	Mater. Res. Bull. 31p1-6	1996
29	S.K.Mishra, L.C.Pathak, V.Rao, D.Bhattacharya and K.L.Chopra	Studies on microbridges of superconducting YBCO thin film	J. Supercond. 9 p219-p224	1996
30	D Panda, S K Ray, A Sarkar, A Dhar, D Bhattacharya and K L. Chopra	e-beam deposition of lead lanthanum zirconate titanate thin films for electronic applications	J. Appl. Phys. 79, 108	1996
31	Asoka Kumar, D Panda, S K Ray, B Mathur, D Bhattacharya and K L Chopra,	Effect of electrode microstructure on leakage current in lead-lanthanum-zirconate-titanate multilayer capacitors,	Appl. Phys. Lett., 68, 1344	1996
32	A Sarkar, S K Ray, A Dhar, D Bhattacharya and K L. Chopra,	In situ grown superconducting films on buffered silicon substrates for device applications	J. Superconductivity , 9, 225	1996
33	L.C.Pathak, S.K.Mishra, D.Bhattachraya and K.L.Chopra	A comparative study of YBCO Powders prepared by different processes	J. Mater. Sci. Lett. 16 p1208-1211	1997

34	S.K.Mishra, L.C.Pathak D Bhattacharya and V.Rao	Synthesis of submicron Ba-hexaferrite powder by a self-propagating chemical decomposition process,	Mater. Lett. 32 p 137-141	1997
18	L.C.Pathak, S.K.Mishra, D.Bhattacharya, A.Dhar and K.L.Chopra	Effect of laser annealing on Y-Ba-Cu-oxide superconductors	Mater. Res. Bull. 32 p619-625	1997
35	A K Kar, A Dhar, S K Ray, B K Mathur, D Bhattacharya, and K L Chopra	Scanning tunneling microscopic and spectroscopic investigation of the microstructural and electronic properties of the grain boundaries of giant magnetoresistive manganites	J.Phys: Cond.Matter 10,10795	1998
36	L.C. Pathak, S.K.Mishra, D.Bhattacharya and K.L.Chopra	Degradation of BPSCCO superconductors during processing	J. Mater. Sci. 34 1619	1999
37	L.C.Pathak, S.K.Mishra, D.Bhattacharya and K.L.Chopra	Synthesis and sintering characteristics of YBCO-Ag superconductors	J. Mater. Res. 14 4148	1999
38	L.C.Pathak, S.K.Mishra, D.Bhattacharya and K.L.Chopra	Sintering characterstics of submicrometre sized $SrTiO_3$ powder prepared by co-precipitation process	Trans. Mater. Res. Jpn. 24(4) 525	1999
39	L.C.Pathak, S.K.Mishra, S.K.Das, D.Bhattacharya and K.L.Chopra	Effect of sintering atmosphere on the weak-link behaviour of YBCO superconductors	Physica C, 351, 295-300	2001
40	B. Panda, C.B. Samantaray, A. Dhar, S.K. Ray and D. Bhattacharya	Electrical properties of rf magnetron sputtered $Ba_xSr_{1-x}TiO_3$ films on multilayered bottom	J. Mat. Sc. Matls. in Electronics, 13 PP 263	2002
41	B. Panda, C.B. Samantaray, A. Dhar, M.L. Mukherjee, D. Bhattacharya and S.K. Ray	RF magnetron sputtered high k-barium strontium titanate thin films on magneto-resistive $La_{0.7}Ca_{0.3}MnO_3$	Materials Science & Engg. (B), B88 PP 14	2002
42	L.C.Pathak, S.K.Mishra, D.Bhattacharya and K.L.Chopra	Synthesis and sintering characteristics of YBCO superconductors	Mater. Sci. Engg. B 110(2) 119-131	2004
43	D. Panda, M. Ranot, K.Das, D. Bhattacharya, A. Dhar, M. Chakraborty and S.K.Ray	Synthesis and characterization of nickel titanium melt-spun ribbon for microactuator device application"	Ind. J. Engineering & Material Sciences, vol.15, pp.95-98	2008
44	A. Roy, A. Dhar, D. Bhattacharya and S. K. Ray	Characteristics of $Al/SrBi_2Ta_2O_9/HfO_2/Si$ structure using HfO2 as buffer layer for ferroelectric memory application	J. Phys. D: Appl. Phys, 41, 095408	2008

45	A. Roy, S. Maity, A. Dhar, D. Bhattacharya and S. K. Ray	Temperature dependent leakage current behavior of pulse laser ablated SrBi2Ta2O9 thin films	Journal of Applied Phys., 105, 044103	2009
46	S Maity, A Dhar, D Bhattacharya, S K Ray	Role of growth temperature, oxygen partial pressure on structural and electrical properties of pulsed laser deposited La_1-xSr_xMnO_3	J Physics Chemistry of Solids 72, **804 - 809**	2011
47	S. Maity, D. Bhattacharya, S. K. Ray	Structural and impedance spectroscopy of pseudo-co-ablated $(SrBi_2Ta_2O_9)_{(1-x)}$–$(La_{0.67Sr0.33}MnO_3)_x$ composite	J. Phys. D: Appl. Phys.,, **44, 095403**	2011
48	S. Maity, S. K. Ray and D. Bhattacharya	Phase, morphology and core level electron spectroscopy of nano-sized $La_{0.65}Sr_{0.35}$ MnO_3 powder prepared by solution combustion synthesis	J Phys Chem Solids, **315 - 321**	2013
49	Shuvendu Tripathy and Debasis Bhattacharya	Rapid synthesis and characterization of mesoporous nanocrystalline $MgAl_2O_4$ by flash pyrolysis route	Journal of Asian Ceramic Societies, **1(4), 328-332**	2013
50	Tavrit Patel, Supratim Suin, D. Bhattacharya and B. B. Khatua	Transparent and thermally conductive polycarbonate and alumina nano composites: Preparation and Characterization	. Polymer-plastics Technology and Engineering, **Vol 52, 1-9**	2013
51	. Manidip Jana, Debasis Bhattacharya,Surajit Gupta, Swapan Kumar Das	Effect of pyrolusite on the densification behaviour of alumina-kaolin system: Towards sintered high alumina refractory aggregate	Refractories World Forum, 2014, 61-68	2014
52	. Siddiqui Abdul Rahim, Mousumi Pal, Debasis Bhattacharya, Swapan Kumar Das .	The Difference in Phase and Microstructural Evolution between Two Kinds of Kaolinitic Clay Containing Fly Ash Incorporated Porcelain	Ceramic Forum International, 91 60-64	2014
53	. Manidip Jana, Debasis Bhattacharya,Rajesh Bahinipati, Swapan Kumar Das	Thermo-mechanical behaviour of LCC in presence of liquid phase containing sintered alumina aggregate	. Australian Ceramic Society, **50(2) 1-8**	2014
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55	. Bhattacharjee, P., Kundu, B., Naskar, D., Maiti, T. K., Bhattacharya, D., and Kundu, S. C.	Nanofibrous nonmulberry silk/PVA scaffold for osteoinduction and osseointegration	. Biopolymers, 103(5), 271-284	2015

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57	Bhattacharjee, P., Kundu, B., Naskar, D., Kim, H. W., Bhattacharya, D., Maiti, T. K., and Kundu, S. C.	Potential of inherent RGD containing silk fibroin–poly (Є-caprolactone) nanofibrous matrix for bone tissue engineering	. Cell and Tissue Research 363:525–540	2015
58	Bhattacharjee, P., Naskar, D., Maiti, T. K., Bhattacharya, D., and Kundu, S. C.	Non-mulberry silk fibroin grafted poly (Є-caprolactone)/nano hydroxyapatite nanofibrous scaffold for dual growth factor delivery to promote bone regeneration	. Accepted for publication Journal of Colloid and Interface Science	2016
59	Bhattacharjee, P., Naskar, D., Maiti, T. K., Bhattacharya, D., & Kundu, S. C	Non-mulberry silk fibroin grafted poly (Є-caprolactone) nanofibrous scaffolds mineralized by electrodeposition: Optimal delivery system for growth factors to enhance bone regeneration	. RSC Advances, 2016, DOI: 10.1039/C6RA01790H	2016