

Material for Annual Report for the year 1999-2000

The National Wind Tunnel facility inaugurated last year is now attracting a number of projects in the area of aerospace and non-aerospace fields. A proposal has been submitted to DST for the funds for the second phase of work.

Transport Aircraft Division, H.A.L. Kanpur is keen to interact with I.I.T. Kanpur in number of areas for modification of the existing aircraft. Negotiations are going on.

A short term course on Helicopter Technology in association with Rotary Wind R&D Centre, H.A.L. Bangalore was organized at H.A.L. Staff College.

The department organized the 14th National Convention of Aerospace Engineers during March 2000. Two more conferences are stated to be organized during December 2000.

The educational flight testing programme was conducted for Aerospace Engineering Students from I.I.Ts, P.R.C. Chandigarh and M.I.T. Madras. The Aeronautical Research and Development Board, Ministry of Defence, G.O.I. provided partial financial support to carry out this activity.

Faculty members from the department participated and presented papers at National and International Conferences.

The department added 5 to 6 sponsored projects from ISRO and ARDB.

## BOOKS AND BOOK-CHAPTERS PUBLISHED

### CENTRE FOR LASER TECHNOLOGY

1. Topics in Modern Optics, New Age International Publishers, A. S. Parasnis, H. R. Sarma & R. K. Thareja.

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### DEPARTMENT OF CIVIL ENGINEERING

1. Dynamic Soil Tests and Applications, A. H. Wheeler Publishing Co., New Delhi, 2000 (in press), N. S. V. Kameswara Rao.

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### DEPARTMENT OF ELECTRICAL ENGINEERING

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#### **DEPARTMENT OF MECHANICAL ENGINEERING**

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2. Elements of Fracture Mechanics, Wheeler Publication, New Delhi, 1999, Prashant Kumar

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**CENTRE FOR LASER TECHNOLOGY**

1. Laser Heated Pedestal Growth Technique for Growing Single Crystal Fibers, Jol. Of Optics Vol. 28, p.69, 1999, Bansil Lal.
2. Preparation of Single Crystal Fibers of LiNbO<sub>3</sub> Proc. National Laser Symposium, Dec. 15-17, 1999, pp.409 (Hyderabad) , Khem Chand Joshi, Arvind Mohan, K. V. Rao and Bansil Lal.
3. Fluorescence spectroscopic Investigations of Normal and Tumor Human Breast Tissues, , A. J. Phys., 8(2), 179-184, 1999, R. N. Panda, A. Agarwal and A. Pradhan.
4. Raman Scattering, Photoluminescence and Excitation Spectroscopy in Natural and Synthetic Ruby, to be published in A. J. Phys., 8(2), 0000, 1999, H D Bist, M. S. Navati, A Pradhan, E Zharikov, A Misra and H B Tripathi.
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4. An Untouchable Record, Letter, Chemical Engineering Progress, 95(10), 1999. J.P. Gupta.
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59. A Review of pQCD calculations of Electromagnetic Form Factors of Hadrons, P. Jain, B. Kundu, H.N. Li, J. Ralston and J. Samuelsson, Nuclear Physics A666& 667, 75c (2000), conference proceedings of the NUCLEON'99, June 7-9, 1999, Frascati, Italy.
60. Non-degenerate wave mixing in saturable absorbers (Invited Talk), K K Sharma and Alok Sharan; p.286-294, Proceedings of International Conference on Laser Materials and Devices held at Defence Science Centre, Delhi during Dec 8-10, 1999, Publishers: Allied Publishers Limited.
61. Narrow band optical filter using fluorescence doped in boric acid glass films, Alok Sharan and K K Sharma; p.246-248, Proceedings of International Conference on Laser Materials and Devices held at Defence Science Centre, Delhi during Dec 8-10, 1999, Publishers: Allied Publishers Limited.
62. Nearly-degenerate four wave mixing in R6G doped boric acid glass films, Alok Sharan and K K Sharma, p.171-172; Proceeding of the National Laser Symposium held at University of Hyderabad, Dec. 15-17, 1999.

**CENTRE FOR LASER TECHNOLOGY**

1. Seminar on "HTML: Basics for Web site development", SIDBI assisted Short term course for small scale industries on E-commerce, Coordinator A. Mittal and P. K. Kalra.
2. Seminar on "Mobile Computing", Telematics Course, Oct. 1999, IIT Kanpur, Coordinator V. Sinha & A. K. Chaturvedi.
3. Proc. Laser Materials and Devices, Laser Science and Technology Centre, DRDO, New Delhi, Dec. 8-10, 1999, "Laser Deposited Thin Films for UV Lasers", pp. 374, R K Thareja. (Invited talk)

**DEPARTMENT OF CHEMICAL ENGINEERING**

1. Non-Newtonian Flow Past a Sphere, Cape Town, June 1999, R. P. Chhabra.
2. Viscoplastic Flow Past a Sphere, University of Stellenbosch, July 1999, R. P. Chhabra.
3. Motion of Spheres in Viscoplastic Media, University of Natal, Durban, June, 1999.
4. Non-Newtonian Fluid Flow over an Array of Cylinders, University of Sydney, Nov. 1999.
5. Liquid Flow Texture in Trickle-Bed Reactors, Dept. of Chem. Engg., University of Houston, Texas, U. S. A., June 1999, Dr. D. P. Rao.
6. The Design of Absorbers: A Flight of Fantasy, June 1999, Dr. D. P. Rao.
7. Catalytically Grown Carbon Nanofibers-DMSRDE, Kanpur, January 2000, D. Kunzru.
8. Multiphase Reaction - DMSRDE, Kanpur, February 2000, D. Kunzru.
9. Reactor Design for Vapor Phase Reactions - Hindustan Lever Research Centre, Mumbai, March 2000, D. Kunzru.
10. Industrial Safety Database: Creation and Uses, Invited talk at the 'Safety and Health - Challenge in the next Millenium', Taj Mahal Hotel, Lucknow, India, July 1999, J. P. Gupta.

## DEPARTMENT OF CHEMISTRY

1. Partial Charge Transfer: Manifestation in the Photoreduction of Cyclic Azoalkanes by Amines and in the Triplet Lifetimes of Substituted 1,4-Diones (Diastereomeric Discrimination) Eight National, J. N. Moorthy.
2. Dynamics of (He, H<sub>2</sub><sup>+</sup> Collisions, Panjab Univ., Chandigarh, Aug. 2, 1999, N. Sathyamurthy.
3. The Technique of Monte Carlo Simulation, A. Chandra.
4. Simulation of Solid-Liquid Interfaces, The University of Burdwan, March 22, 2000, A. Chandra.
5. Emerging Trends in Organic Chemistry (Golden Jubilee Celebration), Indian Association for the Cultivation of Science, Calcutta, Jan. 13-14, 2000, V. K. Yadav.
6. Fluorescent Signalling by Transition Metal Ions, National Symposium on Structure and Reactivity, IISc, Bangalore, August 1999, P. K. Bharadwaj.
7. Supramolecular Chemistry of Cryptands I, Burdwan University, September, 1999, P. K. Bharadwaj.
5. Supramolecular Chemistry of Cryptands II, Burdwan University, September, 1999, P. K. Bharadwaj.
6. Heterotopic Cryptands: from Homogeneous Catalysis to Fluorescence sensors to Synthetic Amphiphiles, University of Saarland, Germany, June 1999, P. K. Bharadwaj.
7. Molecular Recognition and Catalysis by Heterotopic Cryptands, Technical University of Karlsruhe, Germany, June 1999, P. K. Bharadwaj.
8. Cryptands: the Wonder Molecules, University of Cologne, Germany, July 1999, P. K. Bharadwaj.

## DEPARTMENT OF CIVIL ENGINEERING

1. Wavelet-Based Stochastic Seismic Response of Linear Systems Organization : Universita de Roma 'La Sapienza', Italy, June 4, 1999, V. K. Gupta.

#### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

1. S. K. Aggarwal: Visited Mahendra British Telecom several times for seminar and project discussions.
2. M. Agrawal: Identity testing using Chinese remaindering, IISc Bangalore, June 1999.
3. S. Biswas: A new primality testing algorithm, University of Nebraska-Lincoln, August 1999.
4. S. Biswas: A new primality testing algorithm, Iowa State University, Ames, Sep 1999.
5. P. Jalote: *Why is level 5 above level 4*, Plenary talk, SEPG in India, 2000, Bangalore.
6. D. Sanghi: Visited Army Research Lab, MD, USA, and University of Maryland, College Park, MD, USA, in Dec. 1999, and gave seminars there.
7. D. Sanghi: Invited to ITU Seminar on Internet Protocol, Bangalore, Mar 2000, to give a seminar on IPv6.

#### DEPARTMENT OF ELECTRICAL ENGINEERING

1. Switching Techniques for Switchmode Rectifiers, PEDS, July 26-29, Hongkong, 1999, G. K. Dubey.
2. Switchmode Rectifiers with Indirect Current Control, PESC, June 27- July 1, Charlston (USA), 1999, G. K. Dubey.
3. Realization and Hardware Implementation of an Instantaneous Reactive Volt-Ampere Compensator and Harmonic Suppressor Systems, 4<sup>th</sup> Int. Seminar INTRONICS, Jan 22-23, Mumbai, 1999, G. K. Dubey.
4. Workshop on "Recent Trends in Power System Planning and Control", Asian Institute of Technology, Bangkok, Thailand, 30 April-4 May, 1999, S. C. Srivastava. (Resource Person)
5. Workshop on "Power Quality and Distribution Automation", Asian Institute of Technology, Bangkok, Thailand, 16-18 June, 1999, S. C. Srivastava. (Resource Person)
6. Basics and Applications of Turbo Codes, Aachen University of Technology (RWTH), Aachen, Germany, June 16, 1999 : 1. 30 pm; Seminarraum, V. Sinha.
7. Higher Technical Education System in India, The Helsinki University of Technology (HUT), Helsinki, Finland, September 17, 1999 : 11:00 a. m. , V. Sinha.

8. Turbo Codes, The Helsinki University of Technology (HUT), Helsinki, Finland, September 17, 1999 : 14:15 p. m. , V. Sinha.
9. Error Control Coding Using TURBO CODES, Swiss Federal Institute of Technology (EPFL); Lausanne, Switzerland, July 12, 1999 Monday 11:30 INR 012. , V. Sinha.
10. Mobile Satellite Communications, Swiss Federal Institute of Technology (EPFL) ; Lausanne, Switzerland, December 13, 1999 Monday 17:15 IN 202 SSC Seminar, V. Sinha.
11. Parameter Descriptions In Mobile Satellite Communications, Swiss Federal Institute of Technology (EPFL); Lausanne, Switzerland, December 15, 1999 Wednesday 14:15 INF 213 SSC Seminar, V. Sinha.
12. Cell Design Principles In Microcellular Wireless Communication, Swiss Federal Institute of Technology (EPFL); Lausanne, Switzerland, December 21, 1999 Tuesday 17:15 INF 211 SSC Seminar, V. Sinha.
13. Seminar on "HTML: Basic for Web Site Development", SIDBI assisted Short Term Course for Small Scale Industries on E. Commerce, IIT Kanpur, Y. N. Singh.
14. Seminar on "Mobile Computing", Telematics Course, Oct. 1999, IIT Kanpur, Y. N. Singh.
15. QNAT-A Graphical Queuing Network Analysis Tool, Nanyang Technological University, Singapore, S. K. Bose.
16. Distributed Dynamic Bandwidth Allocation and Management for Self-Healing Broadband Networks with Multi-Class Traffic, Nanyang Technological University, Singapore, S. K. Bose.
17. Asymmetric IP Router for High-Speed Internet Access, Nanyang Technological University, Singapore, S. K. Bose.
18. Performance Analysis of Discrete-time Open Queuing Networks, Nanyang Technological University, Singapore, S. K. Bose.
19. Variable Speed AC Drives, BHEL, Bhopal, 26 Feb. 2000, S. P. Das.
20. Delivered a lecture in the 2½ days short course on "3G Terrestrial Radio Standards" held at Chennai and Coordinated jointly by IIT Madras and Usha Martin Group. Attended by 40 participants from industry, A. K. Chaturvedi.

## DEPARTMENT OF INDUSTRIAL AND MANAGEMENT ENGINEERING

1. Partitioning and Searching Dictionary for correction of optically read Devanagri character strings International Conference on Document Analysis and Recognition, *Proceedings*, 1999, V. Bansal and R. M. K. Sinha.
2. On how to describe shapes of Devanagri characters and use them for recognition, International Conference on Document Analysis and Recognition, *Proceedings*, 1999, V. Bansal and R. M. K. Sinha.
3. Interacting with Small and Medium Size Enterprises - A Case Study of OR Application, Invited paper, *OR99*, Tirupati Dec 20-22, 1999, A. K. Mittal.
4. IPR some relevant issues, *Workshop on Intellectual Property Rights*, March 11, IIT Kanpur, 1999, A. K. Mittal.
5. A Study of the Effects of ERP—Implementation on Competencies Required for Effective Job Performance, *International Conference on Operations Management for Global Economy (POMS-99)* Delhi December 21-24, 1999, A. K. Mittal, S. Kumar, N. K. Sharma.
6. Managing Service Quality-Role of Quality Circles, Invited paper, *National Convention of Quality Circles*, Durgapur, January, 1999, A. K. Mittal.
7. Application of Genetic Algorithms to Single Level Lot Sizing Problems with Shortage Costs, Operations Management for global Economy, IIT Delhi *Proceedings*, Dec. 21-24, pp. 572-581; ISBN: 81-7484-030-3, 1999, R. R. K. Sharma and M. V. Rao.
8. Difficulty in Aligning Manufacturing Decisions with Objectives in Dynamic Environments, Operations Management for global Economy IIT Delhi, *Proceedings* Dec. 21-24, 1999. pp. 40-57. ISBN: 81-74 84-030-3, 1999, R. R. K. Sharma and V. R. K. Reddy
9. The Automotive Industry in the Context of globalization: A Comparative Study of Brazil and India, Academy of Business and Administrative Sciences International Conference *Proceedings*, Barcelona, July 12-14, 1999, Ivan A. Pinheiro and A. P. Sinha.
10. Advanced Quality Engineering using Genetic Algorithms, May 7-11, Salt Lake City, Utah, 2000, Tapan P. Bagchi
11. Hybridized Gas, Some New Results in Flowshop Scheduling, IASTED MS 2000 International Conference on Modelling, *Proceedings*, Pittsburgh, May 15-17, 2000, Tapan P. Bagchi.
12. Play it Again, Sum Stochastic Modeling of Movies Replacement, May 7-11, Salt Lake City, Utah, 2000, S. Swarni, M. Puterman, and C. Weinberg.



13. Implementation of a Marketing Decision Support System in a Dynamic Context, University of California, Los Angeles, June 22-25 2000, S. Swami, J. Eliashberg, C. Weinberg.

#### DEPARTMENT OF MATHEMATICS

1. An invited talk on "A nonlinear version of the Sturm's-Comparison Theorem", Florida Institute of Technology, Melbourne, FL, USA, May 19-25, 1999, Raghavendra, V.
2. Delivered a lecture on "Genotype-Environment Interaction, Analysis and Interpretation", Indian Institute of Pulses Research (ICAR), Kalyanpur, Kanpur, 3rd March, 2000, Shukla, G.K.
3. Harmonic Analysis of Operators, The Marcel Riesz Theorem, University of Allahabad, Allahabad, 27th March, 2000, Tewari, U.B.
4. The Multiplier Problem, University of Allahabad, Allahabad, 29th March, 2000, Tewari, U.B.
5. The Marcel Riesz Theorem, University of Allahabad, Allahabad, 31st March, 2000, Tewari, U.B.

#### DEPARTMENT OF MATERIALS AND METALLURGICAL ENGINEERING

1. Theoretical Modeling of Metal-Hydrogen Interactions in Pd Clusters, Tenth International Conference on Rapidly Quenched and Metastable Materials, Bangalore, August 23-27, 1999, R. Balasubramaniam and V. Srivastava.
2. National Conference on Electron Microscopy and 23<sup>rd</sup> Annual Meeting of the Electron Microscope Society of India, DMSRDE, Kanpur, December 1-3, 1999, R. Balasubramaniam and M. Sen.
3. Corrosion issues in critical aircraft components (Invited), Challenges of New Millennium in the Field of Aerospace Materials, Aeronautical Society of India, HAL Kanpur, April 2000, R. Balasubramaniam.
4. Characterization of Delhi Pillar Rust by X-Ray Diffraction, Fourier Transform Infrared Spectroscopy and Mossbauer Spectroscopy, Annual Technical Meeting of IIM, held at IIT Kanpur, Nov. 13-16, 1999, R. Balasubramaniam and A. V. Ramesh Kumar.
5. On Chemical Reactions during casting of Aluminum-Coke and Aluminum-Ash Composites, Annual Technical Meeting of IIM, held at IIT Kanpur, Nov. 13-16, 1999, S. Anand, N. K. Batra and P. K. Rohtagi.

6. Advanced High-Temperature Materials for the Hot Sections of Gas Turbine, Engines Challenges of New Millennium in the Field of Aerospace Materials, Aeronautical Society of India, HAL Kanpur, April 2000, S. Bhargava.
7. Studies of Aluminides Formation during Reaction Synthesis of Solid Fe and Liquid Al, Annual Technical Meeting of IIM, held at IIT Kanpur, Nov. 13-16, 1999, M. Sujata, Satyam Suwas and S. Bhargava.
8. Evolution of Microstructure and Texture in Ti-24Al-11Nb Intermetallic alloy, Annual Technical Meeting of IIM, held at IIT Kanpur, Nov. 13-16, 1999, Satyam Suwas, R. K. Ray, A. K. Singh and S. Bhargava.
9. Effect of Thermomechanical Processing on Superplastic Behavior of a two Phase ( $\alpha$ + $\beta$ )Ti-Alloy, Annual Technical Meeting of IIM, held at IIT Kanpur, Nov. 13-16, 1999, K. M. Baburao, Satyam Suwas and S. Bhargava.
10. Effect of Process Parameters on Surface Morphology of Metal Powders produced by Free Fall Gas Atomization, Annual Technical Meeting of IIM, held at IIT Kanpur, Nov. 13-16, 1999, D. Singh, S. C. Koris and R. K. Dube.
11. GaAs TCAD tool development: model for defect concentrations and dopant activation after ion-implantation and annealing, RQ10, Bangalore, August 23-27, 1999, Deepak and N. Lakshminarayan.
12. TCAD Simulation Based Assessment of GaAs Boule Quality for Ion Implantation Devices, Annual Technical Meeting of IIM, held at IIT Kanpur, Nov. 13-16, 1999, Deepak.
13. Oxidation Phenomena of Polysilicon/Tungsten Silicide Structures, Annual Technical Meeting of IIM, held at IIT Kanpur, Nov. 13-16, 1999, M. Krishna, Deepak and M. Katiyar.
14. Investigation of hydrogen plasma induced phase transition from  $\alpha$ -Si:H to  $\beta$ -Si:H using real time infrared spectroscopy, Tenth International Conference on Rapidly Quenched and Metastable Materials, Bangalore (India), Aug. 1999, Monica Katiyar and John R. Abelson.
15. A computational and experimental study of residence time distributions (RTD) in different tundish designs, 83<sup>rd</sup> Steelmaking conference (ISS), Pittsburgh, USA, 2000, Dipak Mazumdar.
16. Some fundamental considerations concerning gas injection in steelmaking ladles, 83<sup>rd</sup> Steelmaking Conference (PTD)(ISS), Pittsburgh, 2000, Dipak Mazumdar.

29. Experimental and theoretical characterization of non-uniform spatial arrangements of fibers in composites, Annual Technical Meeting, Indian Institute of Metals; Kanpur, November, 1999, Asim Tewari.
30. Shape memory alloys: A materials perspective, National Aerospace Laboratories (NAL), Bangalore, co-sponsored by ISAMPE, October, 1999, Asim Tewari.
31. Gravitational effect on compact reshaping and microstructural evolution during liquid phase sintering, 7<sup>th</sup> Intl. Conference on Sintering-Sintering-2000, 22-25 February, 2000, New Delhi, A. Upadhyaya and R. M. German.
32. Processing strategies for consolidating tungsten heavy alloys for ordnance applications, 7<sup>th</sup> Intl. Conference on Sintering-Sintering-2000, 22-25 February, 2000, New Delhi, A. Upadhyaya
33. Advances in processing of hard metals, Intl. Workshop on Advances in Cemented Carbides, February 21, 2000, New Delhi, A. Upadhyaya.
34. Alloy design aspects of cemented carbides, Intl. Workshop on Advances in Cemented Carbides, February 21, 2000, New Delhi, A. Upadhyaya.
35. Some issues in sintering SC and Technology, 7<sup>th</sup> Int. Conference on Sintering, Feb. 2000, New Delhi, G. S. Upadhyaya.
36. Effect of CrB addition on sintering of 316L/434L stainless steels - 10V/Cr<sub>3</sub>C<sub>2</sub> composites, Ibid, P. Date and G. S. Upadhyaya.
37. TiB<sub>2</sub> based sintered porous cements, ibid, M. Singh, K. N. Rai and G. S. Upadhyaya.

#### DEPARTMENT OF MECHANICAL ENGINEERING

1. Measurement of three dimensional temperature fields in fluids using laser-interferometry, a series of 5 lectures presented to senior officers of DRDL, Hyderabad, March 1999, Dr. K. Muralidhar.
2. Mathematical modelling of thermal processes during crystal growth, delivered at Solid State Physics Laboratory, New Delhi on 30 April 1999, K. Muralidhar.
3. Mathematical modelling of regenerators in stirling cryocoolers, seminar presented at Kyoto University, June, 1999, K. Muralidhar.
4. Large Eddy Simulation of Turbulence: Some Applications, International Symposium on Challenges and New Directions in Computation of Internal Flows, IIT Madras, January 7-8, 2000 pp. 157-168 of the Proceedings. (Invited Lecture), G. Biswas.



5. Use of Organized Vortices for Improved Performance of Heat Exchanger Surfaces, Fourth ISHMT-ASME Joint Heat and Mass Transfer Conference, Pune, January 12-14, 2000, pp. 65-75 of the Proceedings. (Invited Lecture), G. Biswas and N. K. Mitra.

#### DEPARTMENT OF PHYSICS

1. Genetic algorithms and Simulated Annealing: Applications to Si-H clusters, IIT Kanpur, Sept. 1999 (R. Prasad).
2. Kaluza-Klein Dipole Brane/Anti-brane Pair and Instabilities, IISc, Bangalore, January 6, 2000. (S. Mukherji)
3. Renormalization of gauge Theories-1999 Nobel Prize" IIT Kanpur, 16.11.99 (S.D. Joglekar).
4. Green's functions in Axial and Lorentz gauges and the axial poles prescription, IIT Kanpur, 11.4.2000 (S.D. Joglekar).
5. Green's functions in Axial and Lorentz gauges and the axial poles prescription, Saha Institute of Nuclear Physics, Calcutta, 21.1.2000 (S.D. Joglekar).
6. Material Characterization by Electron Paramagnetic Resonance, DMSRDE, Kanpur, March 22, 2000 (P. Chand).
7. Percolation as a critical phenomena, Physics Colloquium, Department of Physics, IIT Kanpur, October 1999 (S.B. Santra).
8. Biased diffusion in disordered systems, Trends in Condensed Matter Physics, Dept of Physics, IIT Kanpur, Feb 25-27, 2000 (S.B. Santra).
9. Statistical Physics of Vehicular Traffic. ICTP, Trieste, Italy, April 1999 (D. Chowdhury).
10. Statistical Physics of Vehicular Traffic. Humboldt University, Berlin, April 1999 (D. Chowdhury).
11. Histories-based description of dynamics, Oct. 1999, IIT Kanpur (Tulsi Dass).
12. Noncommutative Geometry and Finite Field Theories, March 2000, IIT Kanpur (Tulsi Dass).

## CONFERENCE ATTENDED OUTSIDE IIT KANPUR

### CENTRE FOR LASER TECHNOLOGY

1. Invited talk in National Laser Symposium held at University of Hyderabad, Dec. 15-17, 1999, Asima Pradhan.
2. Oral, poster presentation and chaired a session in International Symposium on Biomedical Optics of SPIE at San Jose, CA, USA from Jan. 22-28 2000, Asima Pradhan.
3. Ultraviolet Laser Emission from Pulsed Laser Deposited Thin Film and Bulk ZnO, Proc. National Laser Symposium, Hyderabad University, Dec. 15-17, 1999, pp. 43, Anirban Mitra and R K Thareja.
4. Ultraviolet Laser Emission from ZnO, Proc. Laser Materials and Devices, Laser Science & Technology Centre, DRDO, New Delhi, Dec. 8-10, 1999, , Anirban Mitra and R K Thareja.

### DEPARTMENT OF CHEMICAL ENGINEERING

1. Chemical Engineering Exposition & Conference, Houston, June 1999, Contributed a paper, D. P. Rao.
2. Influence of the Preparative Routes on the Physico-Chemical Properties of  $\text{Cr}_2\text{O}_3$ , National Workshop on Catalysis – Forays into Non-Traditional Areas, 7-8 Jan, 2000, IICT Hyderabad, M. Cherian, M.S. Rao, S.S. Manoharan, A. Pradhan, G. Deo.
3. Safety and Health – Challenges in the next Millenium, Taj Mahal Hotel, Lucknow, July 23, 1999, Invited Talk, J. P. Gupta.
4. Australian Disaster Conference 1999 – Disaster Prevention for the 21<sup>st</sup> Century, Canberra, Nov. 1-3, 1999, Contributed paper, J. P. Gupta.
5. Technological Enhancement and Resource Conservation through R & D – EIL Conference, New Delhi, March 2-3, 2000, D. Kunzru

### DEPARTMENT OF CIVIL ENGINEERING

1. Invited Key Speaker in the Workshop on the Concrete Material and Containment Structure of the 15<sup>th</sup> International Conference on Structural Mechanics in Reactor Technology (SMiRT-15), Seoul, Korea, August, 1999, Chakrabarti, S.K.

3. Chaired the Session on Multimedia Communications I, IEEE 50<sup>th</sup> Vehicular Technology Conference, Amsterdam, September 19-22, 1999; on September 20, 1999.
4. Panel 2 on EE Curricula : How to cope with Evolving, ever-changing Requirements, IEEE 50<sup>th</sup> Vehicular Technology Conference, Amsterdam, September 19-22, 1999; Panelist on the Panel Discussion, on September 20, 1999.
5. The Second International Symposium on Wireless Personal Multimedia Communications (WPMC'99); Amsterdam, September 21-23, 1999; Presented a Contributed Paper.
6. Sixth National Conference on Communications (NCC-2000); I.I.T. Delhi; January 29-30, 1999; Presented an Invited Lecture.
7. Commsphere 2000 International Millennium Conference on Affordable Telecom and IT Solutions for Developing Countries; I.I.T. Madras, Chennai; February 28-March 02, 2000; Presented a Contributed Paper.
8. Commsphere 2000 International Millennium Conference on Affordable Telecom and It Solutions for Developing Countries, I.I.T. Madras, Chennai; February 28-March 02, 2000, Chaired the sessions on (i) "Emerging Telecom Solutions" on February 29, 2000 and (ii) "Affordable Telecom and IT-II" on March 2, 2000.
9. The International Conference on "Frontiers of Biomechanics and its Application to Yoga" UGC-DCA Centre in Fluid Mechanics, Bangalore University, Bangalore, 11-16 December, 1999, Presented a contributed paper.
10. Sixth National Conference on Communications held at IIT, Delhi during January 2000, Presented contributed paper.
11. International Conference on Information, Communication & Signal Processing (ICICS'99), Dec. 7-10, 1999, Singapore, Presented a contributed paper.
12. IEEE International Conference on Industrial Technology (ICIT 2000), Goa, India, 19-22 Jan. 2000, (a) Chaired a technical session entitled "Power Electronics 4". (b) Presented contributed paper
13. Visited alongwith Govt. of India delegation to select universities in Canada and USA, May-June, 1999.
14. Commsphere 2000 International Conference, Chennai, February 29-March 2, 2000 (Presented an invited paper)
15. Seminar organized by ELITEX-2000, Ministry of Information and Technology, New Delhi, Feb. 2000 (Presented an invited paper).





- (i) Invited Talk: "Ionic Conduction in Mixed Crystals: The Role of Wrong Size", K. Shahi.
- (ii) Contributed Paper: "Synthesis of amorphous  $\text{AgI-Ag}_2\text{O-B}_2\text{O}_3$  Superionic Conductors by ball-mill Technique", Anshuman Dalve and K. Shahi.
- (iii) Contributed Paper: "Wrong Size effect in Lithium based Mixed Crystals" B.T.S. Ramarujam and K. Shahi.
- (b) Chaired a session on 3<sup>rd</sup> March (afternoon session) on "Oxide Solid Electrolytes"
3. "QFT2000", Saha Institute of Nuclear Physics, Calcutta, Jan 18-22, 2000, (i) Chaired a session on 19.1.2000; (ii) Invited Talk on 21.1.2000. (S.D. Joglekar).
  4. International Physics Olympiad at Padua, Italy, July 18 to July 27, 1999, Leader of the Indian team in which all five team members won medals: 4 Silver and 1 Bronze. (Vijay A. Singh).
  5. International Physics Olympiad Training Camp, Homi Bhabha Center for Science Education, Bombay, May 24-June 12, 2000 Invited lecturer and evaluator. Further, Academic Co-ordinator Theory of the entire camp. (Vijay A. Singh).
  6. National Laser Symposium, University of Hyderabad, Dec 15-17 (1999), Invited Talk, (A. Pradhan).
  7. International Symposium on biomedical Optics of SPIE at San Jose, CA, USA, Jan 22-28, 2000, Oral, poster presentation and chaired a session. (A. Pradhan)
  8. Millenium Meeting on String Theory at Center for Theor. Studies, IISc, Bangalore from Jan 2-7, 2000, Chairperson for one of the workshop session. (G. Sengupta).
  9. Recent Trends in the Spectroscopy of Rare-Earth ions in a Solid Matrix (Invited Talk), K K Sharma; DAE-BRNS Symposium on Spectroscopy of Lanthanide and Actinides (SLA-99) held at BARC, Mumbai during November 16-19, 1999.



## OTHER ACTIVITIES

### (A) TECHNOLOGY DEVELOPED

#### CENTRE FOR LASER TECHNOLOGY

1. Setup to prepare Single Crystal Fibers. It needs further development

#### DEPARTMENT OF CHEMICAL ENGINEERING

1. Simulated Moving-bed Adsorber Needs Further development, D. P. Rao.

### (B) SOFTWARE DEVELOPED

#### DEPARTMENT OF CHEMICAL ENGINEERING

1. Simulation of Multicomponent Separation Processes, Ready for Transfer, D. P. Rao.
2. HAZOP, DOW 1 (Fire & Explosion Index), DOW 2 (Chemical Explosion Index), POOLFIRE, FIREBALL, Ready for transfer. Some units supplied, J. P. Gupta.
3. Simulator for Liquid-Liquid Extraction using Rate Based Approach (nonisothermal option incorporated, development ongoing), Ashok Khanna.

#### DEPARTMENT OF ELECTRICAL ENGINEERING

1. A Simulation Tool for Evaluating Power Control Schemes in DS-CDMA Cellular Environment, M.Tech. Thesis authored by Amit Sharma. (Further Development Needed)
2. QNAT Software Developed : This is an ongoing effort intended to provide a software tool to study queueing networks using a combination of analysis and simulation. The software provides a graphical interface and is intended for a PC-Windows environment. The source programming is done using C++.
3. The current version uses Mathematica Version 3 as the computing engine. It provides analytical methods to analyze a wide variety of open and closed queueing networks. It can handle both blocking and non-blocking queueing networks, multi-class traffic, and fork-join queues. It also include a simulation option to run a discrete event simulator for the queueing network being analyzed. More details on this software may be found at the following URL-<http://poisson.ecse.rpi.edu/~hema/qnat/>
4. Visited Division of Communications, School of EEE, Nanyang Technological University during Dec. 1998 to Feb. 2000.

5. Offered several courses with other colleagues in NTU to the Telecommunication Authority of Singapore and Singapore Telecom in the area of ATM Networks and High Speed Networks.
6. Lab. view based software development as part of the consultancy project at HAL Korwa. Phase-I Completed and field tests also successful.

#### DEPARTMENT OF MECHANICAL ENGINEERING

1. Software for tomographic reconstruction for non-destructive testing as a part of a DRDL consultancy project (Dr. K. Muralidhar and P. Munshi)
2. 3-D/Axisymmetric Large Deformation Elasto-Plastic Finite Element Software for Analysis of Residual Stresses in Forging (Dr. P. M. Dixit)

#### DEPARTMENT OF PHYSICS

1. TBMD, further development needed (R. Prasad)
2. Two software package developed on Electromagnetism. They are ready for Transfer. (Vijay A. Singh)

#### (C) INDUSTRY VISITED

#### DEPARTMENT OF CHEMICAL ENGINEERING

1. BPCL invited during 1<sup>st</sup> - 3<sup>rd</sup> August 1999 for Kick-off on project "Aromatic Extraction from Petroleum Naphthas, Ashok Khanna.
2. VAM ORGANIC CHEMICALS LTD. on 4<sup>th</sup> March, 1999 as a follow up of VAM's visit in Sept/Oct 1999. It was agreed to take up Pyridine Separation Train Analysis and Trouble Shooting for upgradation purpose. Return trip for MOU signing is awaited, Ashok Khanna.

#### DEPARTMENT OF CIVIL ENGINEERING

1. Visited Aalborg University, Denmark as Guest Professor for two months in April and May, 1999 on the invitation of Dept. of Building Technology and Structural Engineering. This visit was fully supported by the Faculty of Technology and Sciences, Aalborg University. Besides working with Professors S.R.K. Nielsen and P.H. Kirkegaard in this period on joint research, I gave a 12-hour lecture course to Ph.D. students on Wavelet-Based Stochastic Response of Linear Systems,

### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

1. S. K. Aggarwal: Visited Mahendra British Telecom several times.
2. M. Agrawal: Visited IISc, Bangalore in June 1999.
3. D. Gupta: Visited TRDDC, Pune in Mar 2000.
4. D. Sanghi: Visited Army Research Lab, MD, USA, and University of Maryland, College Park, MD, USA, in Dec. 1999.

### DEPARTMENT OF ELECTRICAL ENGINEERING

1. HAL Korwa, October, 1999, December 99, Feb. 2000 in connection with the Software Development activity.
2. BHEL Bhopal, February 2000, to develop a collaborative project with IIT Kanpur.

### DEPARTMENT OF MECHANICAL ENGINEERING

1. Visited (a) Solid State Physics Laboratory, New Delhi, (b) DRDL, Hyderabad and (c) Laser and Plasma Division, BARC, Mumbai last year, K. Muralidhar.
2. Visited State University of New York (SUNY) at Stony Brook and delivered a seminar talk in the Department of Mechanical Engineering, Gautam Biswas.
3. Visited BARC, Mumbai during June 11 to July 10, 1999 for professional interaction as BRNS visiting scientist, Bhaskar Dasgupta.

### (D) PATENTS

#### DEPARTMENT OF MATERIALS AND METALLURGICAL ENGINEERING

1. K.A. Padmanabhan: An Indian patent has been awarded for "A Process of Preparing a Superplastic Alloy Al-Cu-Zr."
2. K.A. Padmanabhan: An Indian patent has been awarded for the "Development of a process to melt, Cast and roll an aluminium alloy equivalent to AFNOR 7020 to obtain properties stipulated by the Indian Space Industry".
3. K.A. Padmanabhan: An Indian patent has been awarded for the "Development of a Suitable Thermo-mechanical Treatment to Induce Superplasticity in a Laboratory made Aluminium Alloy Equivalent to AFNOR 7020".

**(E) AWARDS AND HONOURS****DEPARTMENT OF CIVIL ENGINEERING**

1. Was elected Director (and Member of the Executive Committee) of the International Association for Earthquake Engineering (IAEE) for the period 2000-2004.

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

1. Dr. M. Agrawal was a Programme Committee member for the 14<sup>th</sup> IEEE conference on Computation Complexity held in Atlanta, May 1999.
2. Dr. M. Agrawal was given Young Scientist Award by the UP Council for Science and Technology for the year 2000.

**DEPARTMENT OF ELECTRICAL ENGINEERING**

1. Distinguished Alumnus Award of the Bihar Institute of Technology, Sindri; Golden Jubilee Celebrations.
2. Member of the Council of the Institution of Electronics & Telecommunication Engineers, New Delhi.
3. Chairman, Publications Committee; IETE.
4. Listed in "Marquis Whos Who In The World" & "Whos Who In Science & Engineering".
5. Students Journal Award of IETE for the paper "Line Codes for Optical Fibre Communications System" by P.K. Chatterjee & Joseph John, Award Conferred on 25 September 99 during 42<sup>nd</sup> Annual Technical Convention of IETE.

**DEPARTMENT OF INDUSTRIAL AND MANAGEMENT ENGINEERING**

1. Appointed Convenor, National Taskforce of SIDBI for monitoring of all Training programs sponsored at leading Technology & Management Institutions across the country, Arun P. Sinha.

**DEPARTMENT OF MECHANICAL ENGINEERING**

1. Awarded the M.G. Deshpande Best Paper Prize for the paper, Transition to Chaos in Two Dimensional Flow past a Square Cylinder, 26<sup>th</sup> National Fluid Mechanics and Fluid

Power Conference held at IIT Kharagpur, pp 164-171, (December) 1999, A. K. Saha, K. Muralidhar and G. Biswas.

2. Awarded the INSA fellowship to visit Kyoto University, Japan for three months, May-July 1999, K. Muralidhar.

#### **DEPARTMENT OF PHYSICS**

1. Chief Editor, Bulletin of the Indian Association of Physics Teachers from November 1997 onwards. (Vijay A. Singh).

#### **(F) CONTINUING EDUCATION ACTIVITIES**

##### **DEPARTMENT OF CHEMICAL ENGINEERING**

1. Hazard Analysis in Chemical Industry and Inherently Safer Plant Design, Self sponsored short courses (i) Sept. 14-17, 1999, IIT Bombay, Attendees: 34 from Industry/Government. (ii) Feb. 27-March 1, 2000, IIT Kanpur, Attendees: 39, from Industry/Government, J.P. Gupta.

##### **DEPARTMENT OF CIVIL ENGINEERING**

1. Conducted a one-week short course on "Seismic Design of Reinforced Concrete Buildings" at I.I.T. Kanpur in June 1999.
2. Conducted a one-week short course on "Seismic Design of Reinforced Concrete Buildings" at Imphal in Oct., 1999.
3. Conducted a one-week short course on "Seismic Design of Reinforced Concrete Buildings" at Dewathong (Bhutan) in Dec., 1999.
4. Conducted a one-week short course on "Seismic Design of Reinforced Concrete Buildings" at Nagpur in Dec., 1999.

### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

The department undertook training for IBM-ACE teachers, engineering graduates, and other industries, e.g., Cadence. The details are as follows:

| Name of the course                   | Coordinated by | Type | Place      | Dates               | Number of attendees |
|--------------------------------------|----------------|------|------------|---------------------|---------------------|
| Cadence Induction Training Programme | R. Moona       |      | IIT Kanpur | Jun-Jul, 1999       | 25                  |
| IBM-ACE Teachers training programme  | A. Jain        |      | IIT Kanpur | Sep '99 and Feb '00 | 50                  |
| ACSET Summer School                  | A. Jain        |      | IIT Kanpur | May-July 1999       | 300                 |

Besides these departmental initiatives, individual faculty members also conducted courses for the industry:

| Name of the course | By        | Type | Place           | Dates    | Number of attendees |
|--------------------|-----------|------|-----------------|----------|---------------------|
| CMM in practice    | P. Jelote |      | Santiago, Chile | Mar 2000 | 50                  |

### DEPARTMENT OF ELECTRICAL ENGINEERING

1. Short course on "Mobile Radio Communication Networks", October 25-November 04, 1999; I.I.T. Kanpur (JTG : Joint Telematics Project Sponsored Course); Total no. of participants : 50 (28 from academia) : Course-coordinator as well as instructor.
2. Coordinated a 10 day course entitled "Mobile Radio Communication Networks" from Oct. 25 to Nov. 04, 1999 at IIT Kanpur. 22 participants from industry; 28 participants from academia (Total 50).
3. One of the Coordinators of the CDC Workshop as "Teaching Virtual Instrumentation", 28-29, Feb. 2000 at I.I.T. Kanpur. 13 Engineering College Teachers from all over India.

### DEPARTMENT OF INDUSTRIAL AND MANAGEMENT ENGINEERING

1. Total Quality Management, July - March, Industrial Electronics (LML Limited), Kanpur, 1999, Tapan P. Bagchi.



2. Small Industrial Enterprise Management, Apr 19-Sept 3, (20 weeks), IIT Kanpur, 1999, Arun P. Sinha.
3. Eco-friendly Production and Modern Marketing of Ferrous and Non-Ferrous Products, Dec 15-18, IIT Kanpur, 1999, Arun P. Sinha.
4. A Workshop on Technology and Business Perspective in the New Millenium, March 5, IIT Kanpur, 2000, A. K. Mittal.
5. Workshop on Intellectual Property Rights, March 11, IIT Kanpur, 2000, A. K. Mittal.
6. Workshop on Hospital Management, April 21-24, IIT Kanpur, 2000, Arun P. Sinha.

#### **DEPARTMENT OF MATERIALS AND METALLURGICAL ENGINEERING**

1. Stainless steel making in AOD in the new millenium, April 15-16, 1999, Brahma Deo.
2. Process dynamics in steel making, January 3-6, 2000, Brahma Deo.

#### **DEPARTMENT OF MECHANICAL ENGINEERING**

1. Experimental methods in thermal sciences, 2-7 August 1999, Sponsored by QIP, Government of India, P. K. Panigrahi and K. Muralidhar.
2. 6<sup>th</sup> S. E. R. C. School on Advanced Manufacturing Technology sponsored by DST New Delhi

#### **(G) PARTICIPATION IN HIGH LEVEL INDUSTRY ACADEMIA INDUSTRY INTERACTION PROGRAMME DURING SUMMER**

#### **DEPARTMENT OF MATHEMATICS**

1. Delivered three lectures at "International Mathematics Olympiad Training Camp 1999", HBCSE Centre, Mumbai, 7th May 1999 - 3rd June 1999, Lal, Arbind K.
2. Delivered series of nine lectures on "Basic Linear Algebra", Workshop on "Advanced Training in Mathematics" held at Narmada College, Bharuch, 2st June 1999 - 15th June 1999, Lal, Arbind K.
3. Instructional Seminar on "Development in Graduate Level Mathematics" held at Department of Mathematics, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, 11th-12th October, 1999, Delivered a lecture on "Polya Theory", Lal, Arbind K.

## DEPARTMENT OF ELECTRICAL ENGINEERING

1. Visited Aachen University of Technology, Germany (RWTH) under a Collaborative Programme between IIT Kanpur and RWTH to work at the Chair of Communication Networks; May 02-June 20, 1999.
2. Visited Swiss Federal Institute of Technology, Lausanne, Switzerland as a Visiting Professor and was associated with the work at the LCM (Laboratory for Mobile Communications) during June 21-July 21, 1999.
3. Organised (Chairman) an International Conference and Exposition at I.I.T. Kanpur entitled; "International symposium on Automotive Electronics and Alternate Energy Vehicles"; November 19-21, 1999.
4. Visited Swiss Federal Institute of Technology, Lausanne, Switzerland as a visiting Professor and was associated with the work at the LCM (Laboratory for Mobile Communications) during November 24-December 24, 1999.
5. To keep pace with emerging technologies, a new course on "CDMA Based Mobile Communications" was introduced in the curriculum.
6. Served as GATE-2000, Vice-Chairman at IIT Kanpur, October 1999-March 1999. Continuing this year also.

## DEPARTMENT OF INDUSTRIAL AND MANAGEMENT ENGINEERING

### Research Projects in Progress

1. Development of Scheduling Algorithm and Software for Multi-Satellite Operations Scheduling by Genetic Algorithms, Sponsor Indian Space Research Organization (ISRO), Bangalore, Tapan P Bagchi (PI), Sanjay Kumar (M Tech 2000), Garima Shahi (M.Tech 2001), Sagar Ramesh Kapse ( M.Tech 2001).
2. Specifying the Conditions for the Successful Implementation of the Worldwide Quality Assurance Standard ISO 9000, Sponsor University of Minnesota/National Science Foundation, Tapan P. Bagchi (PI).

## DEPARTMENT OF MECHANICAL ENGINEERING

1. Chairman, Graduate Aptitude Test in Engineering – 2000. Dr. Gautam Biswas.
2. Convener, Centre for Advanced Computing, IIT Kanpur, Dr. Gautam Biswas.

4. Workshop in Statistics in Indian Agricultural Statistics Research Institute, New Delhi, 8th January, 2000, Delivered a lecture on "Use of Bi-plots in Data Analysis", Shukla, G.K.
5. Gave three lectures in the Workshop on Wavelets and Applications, University of Delhi, August 16th to August 27th, 1999, Tewari, U.B.

**(H) ANY OTHER IMPORTANT ACTIVITY NOT SPECIFIED IN ABOVE COLUMNS**

**DEPARTMENT OF CHEMICAL ENGINEERING**

1. AERB/SS/CSE-2, "Design of Steel Structures Important to the Safety of Nuclear Facilities", Atomic Energy Regulatory Board by Chakrabarti, S.K. (To be published).
2. Member, Task Force Committee for the Establishment of Earthquake Risk Evaluation Centre in northern India (1999). The committee developed a report for the Government of India on how to set up this new Centre, by Jain, S.K.
3. Team leader for conducting extensive post-earthquake survey of the Chamoli earthquake of March 1999. The field work was sponsored by the Earthquake Engineering Research Institute (USA) under its Learning From Earthquakes project with the National Science Foundation (USA), by Jain, S.K.
4. Underlook several major consulting projects in Earthquake Engineering by Jain, S.K.

**DEPARTMENT OF CIVIL ENGINEERING**

1. AERB/SS/CSE-2, "Design of Steel Structures Important to the Safety of Nuclear Facilities", Atomic Energy Regulatory Board, Chakrabarti, S. K. (To be published).
2. Member, Task Force Committee for the Establishment of Earthquake Risk Evaluation Centre in northern India (1999). The committee developed a report for the Government of India on how to set up this new Centre, Jain, S. K.
3. Team leader for conducting extensive post-earthquake survey of the Chamoli earthquake of March 1999. The field work was sponsored by the Earthquake Engineering Research Institute (USA) under its Learning From Earthquakes project with the National Science Foundation (USA), by Jain, S.K.
4. Underlook several major consulting projects in Earthquake Engineering, Jain, S. K.

**DEPARTMENT OF PHYSICS**

1. Organized a workshop on "Trends in Condensed Matter Physics" during Feb. 26-28, 2000. (R. Prasad)
2. Selected for Theoretical Physics Seminar Circuit for the year 2000-2001, organized by S.N. Bose National Centre for Basic Sciences, Calcutta (S.B. Santra).
3. Developed a thermodynamics like formalism for mental states giving proper scientific treatment to subjectivity. Presently, I am in the process of giving final shape to a paper (joint with Manoj Srivastava, a PhD student in HSS dept) tentatively entitled "Towards a thermodynamics like formalism for mental states" (Tulsi Dass).
4. Worked as Member of the Accelerator User Committee of Nuclear Science Centre, New Delhi. Attended the "User Workshops" at NSC during July 6-8, 1999 and December 16-18, 1999 and chaired sessions on accelerator applications to Materials Science. (V.N. Kulkarni).
5. Member National Organizing Committee for the International Meeting STRINGS 2001 at TIFR, Mumbai, to be held in Jan. 2001. Jointly sponsored by all the DAE Institutes, IITK, IITM, IITB, Utkal University and Abdus Salam International Center for Theoretical Physics (AS ICTP). (G. Sengupta).