Dr. DEBASISH DATTA

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PERSONAL INFORMATION

- Nationality: Indian
- Date of Birth: January 3, 1952

ACADEMIC BACKGROUND

- **Ph.D.** in Engineering with specialization in the area of Optical Communication, Radar and Communication Center, Indian Institute of Technology, Kharagpur, 1987. Thesis Title: *Bit Synchronization in Fiber Optic Receivers*.
- **M.Tech.** in Microwave and Radar Engineering, Department of Electronics and Electrical Communication Engineering, Indian Institute of Technology, Kharagpur, 1976.
- **B.Tech.** in Radiophysics and Electronics, Institute of Radiophysics and Electronics, Calcutta University, West Bengal, 1973.

RESEARCH INTEREST

- *Optical Networks:* Wavelength-Routed Optical Networks – Transmission Impairments and Cross-Layer Design, Control Plane Design; WDM-based Access Networks – Transmission Impairments in WDM-PONs, Cross-Layer Design of Long-Reach PONs, Data Center Networks – Disaster-Resilient Optical Backbone Design, Intra-Data Center Networks: Bandwidth-Efficient Optical Backplane Design, Elastic Optical Networks

- *Optical Network-on-Chip*: Transmission Impairments in Optical Interconnects, Energy-Efficient Optical Interconnect Topologies.

- *Wireless Networks:* Energy-Efficient Transmission Schemes for Wireless sensor Networks, Link-Adaptation Techniques.

TEACHING EXPERIENCE

- Digital Communications, Data Communications, Analog Communications, Optical Communications, Modern Digital Communication Techniques, Advanced Optical Communication Systems, Optical Networks, Telecommunication Switching and Networks, Broadband Access Networks, Fiber Optic Metrology, Electronic Measurements and Instruments, Pulse and Digital Circuits, Circuit Theory, Basic Electronics, Electronic Devices.

EMPLOYMENTS HELD

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- **1981-todate:** IIT Kharagpur, India - Professor (1999-todate), Associate Professor (1993-1999), Assistant Professor (1986-1993), Lecturer (1981-1986), Head, G. S. Sanyal School of Telecommunications (2010-2012, 1999-2002), Head, Dept. of Electronics & Electrical Communication Engg. (2007-2008)
- **1980-1981:** Philips, Calcutta, India - Production Manager (1978-1980)
- **1978-1980:** IIT Kharagpur, India - Lecturer (1979-1980), Scientific Officer (1978-1979)
- **1976-1978:** Indian Telephone Industries, Bangalore, India - Assistant Executive Engineer

OVERSEAS VISITING ASSIGNMENTS (ON LEAVE FROM IIT KHARAGPUR)

- **2013-2014:** University of Malaya, Kuala Lumpur, Malaysia
- **2003-2004:** Chonbuk National University, South Korea
- **1999 Summer:** University of California, Davis, USA
- **1997-1998:** University of California, Davis, USA
- **1992-1993:** Stanford University, Stanford, USA

SPONSORED/CONSULTANCY PROJECT ACTIVITIES AT IIT KHARAGPUR

1. Development of Pedagogical Methods for Various Classes, Intellectual Calibers and Research in E-learning, National Mission Project on Education through ICT (NMEICT), Web-based Course Under Development: Network Theory, Sponsor: Ministry of Human Resource Development, Government of India, Duration: 3 years.
2. Development of Telecommunication Network Testbed with SDH-based Optical Core Interconnecting Heterogeneous Clusters of Networks (Wired LANs, WiFi-based Wireless LANs, PABX/ISDN/ADSL-based Access Segments), Sponsor: DST-FIST Program, Duration: 5 years.
3. Development of Convergent Switching Technology, Sponsor: Santech Global, Duration: 2years.
4. Design and Analysis of Optical Access Networks employing Wavelength-Division Multiplexing, Sponsor: Ministry of Human Resource Development, Government of India, Duration: 2 years.
5. R&D Interaction/Orientation Program on Optical Networking for Working Engineers, Sponsor: Bharat Electronics Ltd., Bangalore, Consultancy Project.
6. Design and Analysis of Wavelength-Division Multiplexed Optical Local and Metropolitan Area Networks, Sponsor: Ministry of Human Resource Development, Government of India, Duration: 2 years.
7. Development of Tools for Telecommunication Network Planning in Competitive Environment, Sponsor: Nortel, Canada, Duration: 1 year.
8. Development of Advanced Wavelength-routed Optical Networks, Sponsor: European Community Program, Duration: 2 years.
9. System Design and Simulation of Mobile System using Digital FM with Discriminator Detection, Sponsor: Defense Research & Development Organization, Government of India, Duration: 3 years.
10. Development of Fiber Optic Systems in Industrial Applications, Sponsor: Department of Electronics, Government of India, Duration: 4 years.
11. Fiber Optic Monochrome Digital Video Link Design, Sponsor: Electronics Corporation of India Ltd., Hyderabad, Duration: 1.5 years, Consultancy Project.
12. Modeling and Characterization of Multimode and Single-Mode Optical Fibers & Integrated Optical Waveguides, Sponsor: Indo-US Program, Duration: 3 years.

13. Development of WDM Optical Fiber Transmission Plan, Sponsor: Department of Electronics, Government of India, Duration: 3 years.
14. Development of Fiber Optic Communication System for Low Bit-Rate Speech and Picture Signals, Sponsor: Defense Research & Development Organization, Government of India, Duration: 5 years.
15. Development of Millimeter-wave Antenna and Transmission Components, Sponsor: Defense Research & Development Organization, Government of India, Duration: 5 years.
16. Design Optimization of High-Efficiency Earth-Station Antenna System for Satellite Communication System, Sponsor: Space Application Center, Ahmedabad, India, Duration: 3 years – Consultancy Project.

COLLABORATIVE PROJECT ACTIVITIES WITH OTHER UNIVERSITIES

- **Stanford University, USA**

    1. Coherent Optical Communication Systems (Sponsor: Indo-US Fellowship Program, during 1992-93).
    2. Fiber Nonlinearities on Optical WDM Communication System (Sponsor: Indo-US Fellowship Program, during 1992-93).

- **University of California, Davis, USA:**

    1. Transmission Impairments in Wavelength-Routed Optical Networks and Related Cross-Layer Issues – Collaboration carried out during 1997-99 (Sponsor: National Science Foundation (NSF), USA.
    2. Transmission Impairments in Integrated Metro-Access Networks Using WDM-based Metro Rings and WDM-PON-based Access Segments - 2011, Sponsor: NSF, USA.

- **Chonbuk National University, Jeonju, South Korea:**

    1. Fault Management in IP-over-WDM Networks, Sponsor: Korean Science and Engineering Foundation, Duration: 1 year (worked during 2003-2004).
    2. Development of QoS-supported Burst Control Technique for Optical Burst Switched Networks with Multi-Class Services, Sponsor: Korean Science and Engineering Foundation, Duration: 1 year (worked during 2003 – 2004)
    3. Optical Access Networks based on WDM-PON, Sponsor: Korea Industrial Technology Foundation, Duration: 1 year (worked during: 2003 – 2004).

- **Washington State University, Pullman, USA and Rochester Institute of Technology, New York, USA**

    1. Optical Interconnects for Network-on-Chips (NoCs) – Topology Optimization based on Bit-Error Rate (BER) and Maximum Transmit Power Constraints.
    2. Bandwidth-Efficient Modulation Techniques for Optical Interconnects in NoCs.

CONTRIBUTIONS TOWARDS ACADEMIC/ADMINISTRATIVE DEVELOPMENTS AT IIT KHARAGPUR

- **Telecom Networks Laboratory, E&ECE Department:** Developed a comprehensive telecom networking setup, a unique one of its kind in the Telecom Networks Laboratory, with the features of today's networking hierarchy and heterogeneity, including Ethernet switches, IP routers, ATM switches, WiFi Access Points, ADSL modems, ISDN-based PABX, all being

interconnected over an SDH-based optical fiber ring as the core. MTech laboratory classes and short-term courses are being run to disseminate the big picture of today's networking practices to the IIT students as well as to the course-participants from other organizations

- **Fiber Optics Laboratory, E&ECE Department:** Developed fiber optic systems laboratory to conduct the laboratory classes and research activities in the area of Fiber Optics and Lightwave Engineering.
- **Electrical Networks Laboratory, E&ECE Department:** Developed undergraduate laboratory experiments and manual for 2nd year laboratory classes, including some novel experiments, viz., eigen-mode excitation of electrical networks, dynamics of poles in active/passive electrical networks, nonlinearity of electronic devices etc.
- **Basic Electronics Laboratory, E&ECE Department:** Upgraded the erstwhile version of Basic Electronics Laboratory in mid-eighties along with the laboratory manual, which still continues to be in vogue.
- **G.S.Sanyal School of Telecommunications:** As the Chairman, GSSST, during 1999-2002, developed the present setup for GSSST at Takshashila building, and started the R&D activities therein.

RESEARCH GUIDANCE

- **Ph.D. Thesis:** Seven completed, two under progress (+ two co-advised, as visiting faculty)
- **M.S. Thesis:** Three completed
- **M.Tech. Thesis:** Fifty+ completed, three under progress
- **B.Tech. Thesis:** Forty+ completed, three under progress

ACADEMIC/ADMINISTRATIVE POSITIONS HELD AT IIT KHARAGPUR

- **Head,** G. S. Sanyal School of Telecommunication (Currently on 2nd tenure)
- **Head,** Electronics and ECE Department
- **Member,** Network Planning Committee of the Institute
- **Member,** Computer Purchase and Maintenance Committee of the Institute
- **Member,** National Expert Committee for Networking Technical Educational Institutions of India
- **Faculty Adviser,** M.Tech. Course on *Fibre Optics and Lightwave Engineering*.
- **Faculty Adviser,** M.Tech. Course on *Telecommunication Systems Engineering*.
- **Faculty Adviser,** B.Tech Program.
- **Professor-In-Charge,** Teaching-Load Distribution and Time Table of the Department
- **Professor-In-Charge,** Fiber Optic Systems Laboratory.
- **Professor-In-Charge,** Communication Systems Laboratory.
- **Head-Examiner of IIT Kharagpur,** National Graduate Aptitude Test Examination (GATE) for Electrical Communication Engineering.
- **Joint Coordinator,** First-year B.Tech. Course on *Basic Electronics* for All Disciplines of IIT Kharagpur.

AWARDS/HONOURS/INVITATIONS

- **IEEE ANTS 2009:** The paper entitled "Gain dynamics of EDFA chains in wavelength-routed networks," was selected as one of the top eight papers in the conference and its expanded version was published on invitation in *Journal of Optical Switching and Networks*.
- **IEEE ANTS 2008:** The paper, entitled "A heuristic approach for designing hybrid PONs employing WDM and OCDMA with asymmetric traffic distribution," was selected as one of the two best papers in the conference and its expanded version was published on invitation in *Journal of Optical Switching and Networks*.

- **IEEE ANTS 2007:** The paper, entitled "Design methodology for WDM Backbone Networks using FWM-Aware Heuristic Algorithm," was selected as one of the top eight papers of the conference and its expanded version was published on invitation in *Journal of Optical Switching and Networks.*
- **Indo-US Science and Technology Fellowship to visit Stanford University**: Awarded by the Department of Science and Technology, India, and United States Agency for International Development, USA, to work as a Visiting Scientist on coherent optical communications at Stanford University, USA, during the period from July 1992 to June 1993.
- **J. of IERE, UK:** Sir J. C. Bose Premium awarded by the Institution and Electronic and Radio Engineers (IERE) for the paper, entitled "Performance of an Optical Receiver Employing an Avalanche Photodetector in Presence of Timing Uncertainty", in the Journal of IERE, February 1985 Issue.

MEMBERSHIP IN PROFESSIONAL BODIES

- **Senior Member**, IEEE, USA.
- **Life Member**, Institution of Engineers, India.

PROFESSIONAL SERVICES/ACTIVITIES

- **General Co-Chair, IEEE ANTS 2015, International Conference on Advanced Networking and Telecommunication Systems,** Kolkata, India, December 2015.
- **Member, Organizing Committee, PHOTONICS, India, 2014**
- **Member, Steering Committee, PHOTONICS, India, 2008, 2010.**
- **Editor,** IEEE Communications Tutorials and Surveys (2010-2013).
- **Editor,** Journal of Optical Switching and Networking, Elsevier (2006-2010).
- **Technical Program Committee Co-Chair, IEEE ANTS 2012, International Conference on Advanced Networking and Telecommunication Systems,** Bangalore, India, December 2012.
- **Member, Advisory Committee, NCC 2012, National Conference on Communications,** IIT Kharagpur, India, February 3-5, 2012.
- **Member, Technical Program Committee, IEEE ANTS 2011, International Conference on Advanced Networking and Telecommunication Systems,** Bangalore, India, December 18-20, 2011.
- **Guest Editor, Special Issue of JOSN, for Selected Papers from IEEE ANTS 2009.**
- **Track Chair, IEEE ANTS 2009, International Conference on Advanced Networking and Telecommunication Systems,** IIT Delhi, India, December 14-16, 2009.
- **Member, Advisory Committee, Conference on Computers and Devices for ommunications (CODEC),** Kolkata, India, 2006.
- **Member, Technical Program Committee, Broadnets, Optical Networking Symposium**, **2007, 2006, 2005,** USA.
- **Member, Technical Program Committee, Broadband Networks 2004 -- Broadband Optical Network Symposium 2004**, San Jose, California, USA, October 25-29, 2004.
- **Member, Technical Program Committee, Optical Networking and Communications Conference - OptiComm 2003,** Dallas, USA, Oct. 15-18, 2003.
- **Guest Editor**, **Special Issue of *IEEE Journal on Selected Areas in Communication* on *WDM-based Network Architectures*,** January 2002.
- **Member, Technical Program Committee, Optical Networking and Communications Conference - OptiComm 2002,** Boston, Massachusetts, USA, July 29 - August 2, 2002
- **Member, Technical Program Committee, International Conference ICCCD 2011, 2000** on *Computer, Communication and Devices*, IIT Kharagpur, India, December 14-16, 2000.
- **Member, Technical Program Committee, Workshop** on *Optical Networks*, University of Texas, Dallas, USA, January 31 – February 1, 2000.

SHORT COURSES/TUTORIALS (Organizer/Speaker)

- **Convener, Tutorial Sessions, International Conference PHOTONICS-2000** on *Fiber Optics and Photonics***,** Calcutta, India, December 17-20, 2000.
- **Coordinator, One-week Intensive Short Courses** on *Optical Networks* at IIT Kharagpur in March 2001, May 2005.
- **Speaker, Three-day Tutorial** on *Optical Communications and Networking* for Ushamartin Academy of Communication Technology, IIT Campus, Madras, India, August 16 – 18, 2000.
- **Speaker, Half-day Tutorial** on *Optical Networks* in International Millennium Conference (URSI sponsored) **COMMSPHERE 2000** on *Affordable Telecom and IT Solutions for Developing Countries*, IIT, Madras, India, February 28, 2000.
- **One-day Tutorial** on *Optical Networks* in National Conference on Communications **NCC-99**, IIT Kharagpur, India, January 29 – 31, 1999.
- **Coordinator, FOSIS** – National Seminar on *Fibre Optic Systems in Industrial and Service Sectors*, IIT, Kharagpur, India, November 29 – 30, 1989.
- **Reviewer:** IEEE Journal of *Lightwave Technology*, IEEE Transactions on *Networking*, Elsevier Journal of Optical Switching and Networking, International Conferences in the area of Communications, Journal of Institution of Telecommunication Engineers.

PUBLICATIONS

❑ **Journal Papers:**

1. G. Manocha, R. Sen and D. Datta, "Comprehensive Design Methodology of Control and Data Planes in Wavelength-Routed Optical Networks," *Photonic Network Communications,* Springer, In Press.
2. A. Bhattacharya, K. Sinha, R. N. Ghosh, D. Datta and B. P. Sinha, "Non-Contiguous Channel Allocation for Multimedia Communication in Cognitive Radio Networks," *IEEE Tran.s on Cognitive Communications and Networking*, In press.
3. A. Bhattacharya, K. Sinha, D. Datta and B. P. Sinha, MRBNS: A New Energy-efficient Communication Scheme in Low Power Wireless Networks," *International J. of Sensor Networks*, In press.
4. C. Bhar, G. Das, A. Dixit, B. Lannoo, M. V. D. Wee, D. Colle, D. Datta, M. Pickavet and P. Demeester, "A Green Open Access Optical Distribution Network with Incremental Deployment Support," *IEEE/OSA J. of Lightwave Technology,* 2015, vol. 33, No. 19, pp. 4079-4092, 2015.
5. S. Mondal, S. Reddy, G. Das and D. Datta, "Transmission Impairments in Long-Reach WDM-PON using RSOA-based ONUs ," *Photonic Network Communications,* Springer, Vol. 30, pp.321-323, 2016.
6. P Goswami, S. K. Ghosh and D. Datta, "On Methodologies to Estimate Optical-layer Power Consumption and Cost for Long-haul WDM Networks with Optical Reach Constraint," *Photonic Network Communications,* Springer, vol.29, issue 1, pp.12-31, 2015.
7. I. Datta, D. Datta and P. Pande, "Design Methodology for Optical Interconnect Topologies in NoCs with BER and Transmit Power Constraints," *IEEE/OSA J. of Lightwave Technology,* January 2014, Vol. 32, No.1, pp 163 - 175.
8. L. Shi, A. Nag, D. Datta and B.Mukherjee, "New Concept in Long-reach PON Planning: BER-Aware Wavelength Allocation", *J. of Optical switching and Networks*, Elsevier, Vol.10, Issue 4, Nov.2013, pp. 475-480.
9. R. N. Ghosh, K. Sinha, D. Datta and B. P. Sinha, "An Energy-Efficient Communication in Multihop Wireless Networks using Ternary Encoding and Silent Symbols," *Intl. J. Commun. Networks and Distributed Systems*, Vol.11, No.4, pp.376-389, 2013.
10. A. Adhya and D. Datta, "Evaluation of Accumulated FWM Power at Lightpath Ends in Wavelength-Routed Optical Networks," *IEEE/OSA J. of Optical Communications and Networking*, Vol. 4, Issue 4, pp. 314–325, April 2012.

11. P. Goswami, S. K. Ghosh and D. Datta, "Impact of Optical Reach on Wavelength-Routed Optical Networks," Proc. SPIE,12 (2010).

12. K. Sinha, B. P. Sinha and D. Datta, "An Energy-Efficient Communication Scheme for Wireless Networks: A Redundant Radix-Based Approach," *IEEE Trans. on Wireless Communications*, Vol.2, No.10, pp. 550-559, Feb. 2011.

13. K. Sinha, B. P. Sinha and D. Datta, "CNS: A New Energy-Efficient Transmission Scheme for Wireless Sensor Networks," *J. of Wireless Networks*, Springer, Vol. 16, Issue 8, pp. 2087-2014, 2010.

14. K. Chaitanya and D. Datta, "Gain Dynamics of EDFA Chains in Wavelength-routed Optical Networks," *J. of Optical Switching and Networking,* Elsevier, Vol.7, Issue 8, December 2010.

15. J. Ratnam, S. Chakraborti and D. Datta, "Impact of Transmission Impairments on Demultiplexed Channels in WDMPONs employing AWG-based Remote Nodes," *IEEE/OSA J. of Optical Communications and Networking*, Vol. 2, Issue 10, pp. 848-858, October 2010.

16. J. Ratnam, S. Chakrabarti and D.Datta, "A Heuristic Approach for Designing Hybrid PONs Employing WDM and OCDMA with Asymmetric Traffic Distribution," *J. of Optical Switching and Networking,* Elsevier, Vol. 6, Issue 4, pp. 235 -242, December 2009.

17. C. Rama Krishna, S. Chakrabarti and D. Datta, "Comments on Comprehensive Analysis of IEEE 802.11 Distributed Coordination Function," *International J. Wireless Information Networks,* Springer, Vol. 16, No. 4, pp. 237-245, December 2009.

18. R. Mahapatra, A. S. Dhar and D. Datta, "Integrated voice and data transmission employing adaptive modulation in wireless networks", *International J. of Electron. Commun, Elsevier,* vol. 63, no. 12, pp. 1012-1025, Dec. 2009.

19. C. Rama Krishna, S. Chakrabarti and D. Datta, "An Improved Analytical Model for IEEE 802.11 Distributed Coordination Function under Finite Load," *International J. of Communications, Network and System Sciences*, Vol. 2, No. 3, pp. 237-247, June 2009.

20. A. Adhya and D. Datta, "Design methodology for WDM Backbone Networks using FWM-Aware Heuristic Algorithm," *J. of Optical Switching and Networks*, Elsevier, Vol. 6, Issue 1, pp. 10-19, January 2009.

21. R. Mahapatra, A. S. Dhar and D. Datta, "Adaptive digital phase modulation schemes using transition-initiated phase acceleration", *Int. J. of Electronic Commun.,* Elsevier, vol. 62, no. 10, pp. 740-753, Nov. 2008.

22. D. Datta, "Telecommunication networking," *Online Encyclopedia of Life Support System (EOLSS),* UNESCO, 2008.

23. C. Rama Krishna, S. Chakrabarti and D. Datta, "Modeling of IEEE 802.11 DCF for Transient State Conditions," *Journal of Networks*, Vol. 2, Issue 4, pp. 14-19, August 2007.

24. K. E. Young, W. H. Yang, D. Datta and Y. C. Kim, "An AWG-based WDM-PON Architecture Employing WDM/TDMA Transmission for Upstream Traffic with Dynamic Bandwidth Allocation," *Photonic Network Communication*, Springer, Vol.15, pp.191-202, 2008.

25. J. Ratnam, R. Shyamsukha, G. Das, S. Vuta, A. Joglekar, and D. Datta, "Media Access Control Protocols for WDM-based Optical Access Networks with Passive-star Clusters Interconnected by a Backbone Ring," *Computer Communications,* Elsevier, Vol.30, Dec.2007, pp.3614-3626.

26. J. Zhang, L. S. Wang, K. Zhu, L. Song, D. Datta, Y. C. Kim and B. Mukherjee, "Optimized Routing for Fault Management in Optical Burst-Switched WDM Networks" Special Series on Optical Communications and Networking, *IEEE J. of Selected Areas in Communication*, Vol. 25, No.6, Aug. 2007, pp.111-120.

27. R. Mahapatra, A. S. Dhar and D. Datta, "Spectral efficiency of link-adaptive transmit diversity scheme in wireless communication systems", *International J. of Computers, Information Technology & Engineering,* Serials Publication, vol. 1, no. 1, pp. 37-41, June 2007.

28. R. Mahapatra, A. S. Dhar and D. Datta, "On feasibility of a multiplier-less phase-shifting scheme for digital phase modulation and its VLSI implementation", *International J. of Electronics*, Taylor & Francis, vol. 94, no. 2, pp. 171-181, Feb. 2007.

29. J. Ratnam and D. Datta, "Performance evaluation of a packet switched multi-wavelength optical CDMA network," *J. Opt. Communications,* Vol. 27, May 2006.

30. H. J. Lee, K. Y. Song, W. H. So, J. Zhang, D. Datta, B. Mukherjee and Y. C. Kim, "A hybrid restoration scheme based on threshold reaction time in optical burst-switched networks," *Lecture Notes in Computer Science, Springer-Verlag*, Vol.3046, pp.994-1003, May 2004.

31. D. Datta, "Optical networks: recent trends and challenges," (Invited paper) *World Market Research Center* (WMRC), London, UK, Business Briefing: Global Optical Communications (Published in collaboration with *SPIE, OIF, ECOC* 2001 and *APOC* 2001), pp. 36-38, July 2001.

32. D. Das, G. Dutta, and D. Datta, "Packet-error rate based power budget for multiple access WDM networks with subcarrier multiplexed control packets*," IEEE Photonics Technology Letters*, Vol. 12, pp. 359-361, March 2000.

33. B. Ramamurthy, D. Datta, H. Feng, J. P. Heritage, and B. Mukherjee, "Impact of transmission impairments on the teletraffic performance of wavelength-routed optical networks," *IEEE/OSA J. of Lightwave Technology*, Vol. 17, pp. 1713-1723, October 1999.

34. D. Das, S. Saini, and D. Datta, "Performance of computer networks employing linked-cluster architecture with optical backbones using single-wavelength and WDM transmissions," *Computer Communications* (22), pp. 840-848, 1999.

35. D. Datta, B. Ramamurthy, H. Feng, J. P. Heritage, and B. Mukherjee, "BER-based call admission in wavelength-routed optical networks," *Optical Society of America (OSA)* --Trends in Optics and Photonics Series (TOPS)*; Optical Networks and Their Applications* (ISBN: 1-55752-545-5), Vol. 20, pp. 205-210, September 1998.

36. P. T. Kulkarni, D. Datta, and R. Gangopadhyay, "Performance evaluation of multichannel linked-cluster lightwave networks," *J. Optical Communication*, Vol.19, pp.185-189, October 1998.

37. P. T. Kulkarni, R. Gangopadhyay, and D. Datta, "Impact of link failures on the performance of multihop lightwave networks," *Computer Communications* (21), pp. 179-185, 1998.

38. D. Datta, "Coherent optical communication systems," *J. Institution of Electronics and Telecommunication Engineers on Education*, Vol. 38, pp. 183-195, July-December 1997.

39. D. Datta and R. Desai, "Four-wave-mixing in optical ASK WDM transmission system employing heterodyne detection," *J. Optical Communication*, Vol. 16, pp. 186--189, Oct. 1995.

40. D. Datta, D. Goswami, and R. Jarang, "Performance analysis of heterodyne optical receiver employing discriminator detection for Manchester coded FSK transmission*," J. Optical Communication*, Vol. 16, pp. 146-151, August 1995.

41. S. Rakshit, D. Datta, K. O. Srinivas Rao, and S. L. Maskara, "A comparative performance evaluation of high-speed fiber optic local area bus networks*," J. Science and Industrial Research*, India, Vol. 54, pp. 24-34, January 1995.

42. D. Datta, "Analysis of a new technique for optical DPSK transmission without external modulation," *International J. Optoelectronics*, Taylor and Francis, Vol. 8, pp. 451-457, 1993.

43. D. Datta, D. Goswami, A. Srivastava, "Performance analysis of optical FSK heterodyne receiver employing discriminator detection,'' *Proceedings of SPIE*, Vol.62, 1992.

44. D. Datta, S. Rakshit, and S. L. Maskara, "Optical transmitters and receivers for digital fiber optic communication systems," *J. INFOTEL*, C-DoT, India, pp. 55-65, July-Sept.1991.

45. D. Datta and R. Gangopadhyay, "Performance analysis of the delay and exclusive-OR type clock recovery circuit in an APD-based optical receiver," *IEE Proceedings* [Part-J], Vol. 138, pp. 21-32, February 1991.

46. S. Rakshit, D. Datta, V. B. Vinayak, K. Singh, and S. L. Maskara, "Fiber optic local area network: an overview and design of two optical ethernets," *J. Institution of Electronics and Telecommunication Engineers*, Special Issue on *Digital Communication*, Vol. 36, Nos. 5-6, pp. 494-513, 1990.

47. D. Datta and R. Gangopadhyay, "Simulation studies on nonlinear bit synchronizers in APD-based optical receivers," *IEEE Trans. on Communications*, Vol. COM-35, No. 9, pp. 909-917, September 1987.

48. R. Gangopadhyay and D. Datta, "Timing recovery in optical receivers for NRZ signaling," *Electronics Letters*, Vol. 22, pp. 38-39, 2nd January, 1986.

49. R. Gangopadhyay, D. Datta and C. Chandrasekhar, "Performance of an optical receiver employing avalanche photodetector in the presence of timing uncertainty," *J. Institution of Electronics and Radio Engineers*, Vol. 55, pp. 61-66, February 1985.

50. R. Gangopadhyay and D. Datta, "On the performance of a digital optical receiver employing avalanche photodetector," *J. Institution of Electronics and Telecommunication Engineers*, Vol. 29, pp. 538-542, November 1983.

❑ **Conference Papers:**

1. A. Ray and D. Datta, "Traffic grooming in WDM ring network: Minimization of ADMs with real-time and non-real-time traffic demands," iC3S-2016, KIIT Bhubaneswar, February 6-7, 2016.
2. C. Bhar, N. Chatur, A. Mukhopadhyay, G. Das, D. Datta, Designing a Green Optical Network Unit using ARMA-based Traffic Prediction, IEEE ANTS 2015, ISI Kolkata, 15-19 December, 2015.
3. S. Mandal, Swathi R., G. Das and D. Datta, "Transmission Impairments in Long-Reach WDM-PON using RSOA-based ONUs," IEEE ANTS 2014, December 14-17, 2014, Delhi, India
4. P. K. Kaliraj, P. Sieber, A. Ganguly, I. Datta and D. Datta, Performance Evaluation of Reliability Aware Photonic Network-on-Chip Architectures," *Third International Green Computing Conference*, IGCC'12, June 5-8, 2012 in San Jose, California, USA.
5. I. Datta, D. Datta and P. Pande, "BER-based power budget evaluation for optical interconnect topologies in NoCs," *International Symposium on Circuits and Systems*, ISCAS 2012, May 20-23, 2012, Seoul, South Korea.
6. G. Manocha and D. Datta, "Design of control planes for wavelength-routed optical networks," Accepted for presentation in *National Conference in Communications*, NCC 2012, February 3-5, 2012, IIT Kharagpur, India.
7. L. Shi, A. Nag, D. Datta and B. Mukherjee, "BER-Aware Wavelength Allocation Schemes for Long-Reach PON Employing AWG-Based Remote Node," *IEEE International Conference on Advanced Networks and Telecommunication Systems,* IEEE ANTS 2011, December 20-21, Bangalore, India.
8. D. Datta, "Design methodologies for wavelength-routed optical networks with awareness of transmission impairments," *International Conference on Information and Communications Systems*, ICICS 2011, December 13-16, 2011, Singapore.
9. P. Goswami, S. K. Ghosh and D. Datta, "Dimensioning and resource provisioning for IP/MPLS-over-WDM Network,"17th *International Conference on Networks*, ICON2011, December 14-16, 2011, Singapore.
10. D. Datta, "Passive optical networks: the evolving scenario," *Conference on Frontiers of Communication and Instrumentation Engineering*, COIN 2011, November 11-12, 2011, Calcutta, India.
11. P. Goswami, S. K. Ghosh and D. Datta, "Optical-reach constrained dynamic wavelength-routed optical networks," International Conference on Fiber Optics and Photonics, Photonics 2010, Indian Institute of Technology, Guwahati, India, December 11-15, 2010.
12. K. Chaitanya and D. Datta (one of the best eight papers of the conference), "Gain dynamics of EDFA chains in wavelength-routed optical networks," *IEEE International Conference on Advanced Networks and Telecommunication Systems* (IEEE ANTS 2009), IIT Delhi, India, December 16-18, 2009.
13. J. Ratnam, S. Chakrabarti and D. Datta (best paper award in the conference) **"**Resource provisioning through traffic-aware code allocation in a hybrid PON employing WDM and OCDMA," *IEEE International Conference on Advanced Network and Telecommunication Systems* (IEEE ANTS 2008), IIT Bombay, Dec.15-17, 2008.
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Networks,"International Conference on Computational Science and Its Applications (ICCSA 2004),Perugia, Italy, May 14-17, 2004.

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63. D. Datta and R. Gangopadhyay, "A simulation study of clock recovery in APD-based optical receivers," International Conference on Communication Technology, China, November 3-5, 1987.

64. D. K. Kar, D. Datta, and B. K. Sarap, "Design of radially symmetric lens for millimeter wave applications," Asia Pacific Microwave Conference, New Delhi, India, February 24-28, 1986.

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RESEARCH ACTIVITIES

❑ **Current Activities:**

- **Optical Communication Systems:** Modeling of optical and optoelectronic components, Bit-error rate evaluation in high-speed optical links employing multi-level modulation schemes in presence of transmission impairments in nonideal optical and optoelectronic components.
- **Wavelength-Routed Optical Backbones:** Transmission impairments and cross-layer design (offline and online design methodologies), Control plane design, Elastic optical networks
- **WDM-based Access Networks:** Transmission Impairments in WDM-PONs using arrayed-waveguide gratings, Cross-layer design of long-reach PONs, Integration of metro and access networks.
- **Data Center Networks:** Disaster-resilient design of inter-data-center networks, Optical WDM backplane design for intra-data-center networks.
- **Optical Network-on-Chip:** Transmission impairments in optical interconnects, Impairment-aware topology optimization, Coherent transmission schemes for optical interconnects.
- **Wireless Communication Systems and Networks:** Energy-Efficient transmission schemes, Link adaptation schemes for broadband wireless networks, Prioritized handoff schemes for mobile communication systems with statistical multiplexing of voice packets on guard channels.

❑ **Past R&D Activities:**

- **WDM-Based LANs and Access Networks:** WDM LANs and access networks with subcarrier-multiplexing for control packets, MAC protocols with real-time and non-real-time services, Optical CDMA, Hierarchical topology design, Power-budget design based on packet-error rates.
- **Coherent Optical Communication:** Modulation and demodulation techniques, Bit-error rates for various systems in presence of laser phase noise.
- **Fiber Nonlinearities:** Impact of four-wave mixing on bit-error rates in WDM optical links.
- **Bit Synchronization in Optical Communication Systems:** Impact of timing uncertainty of recovered clock on the performance of APD-based optical receivers.
- **WDM Links for Integrated Voice, Video and Data:** Design and implementation of *laboratory prototype* employing two wavelengths – one wavelength transmitting voice and video (electrically multiplexed) and the other wavelength transmitting data stream.
- **Optical Transmitter and Receiver Modules:** Design and implementation of *laboratory prototypes* (at 20 and 32 Mbps) with differential-Manchester coding and delay-and-ExOR scheme for clock recovery.
- **Coherent OTDR Techniques:** Performance analysis of Coherent OTDR for fibre-attenuation measurements.
- **Setting-up of Departmental Computer Network:** Design and development of the existing departmental computer network and its interface with the optical backbone of IIT Kharagpur campus.
- **Telecom/Data Networking Solutions:** Served in the national committee towards the planning and development of the voice/data access network infrastructure for IIT Kharagpur campus.

TEACHING ACTIVITIES

- **Postgraduate Theory Subjects Taught**: Telecommunication Switching and Networks, Advanced Optical Communication, Optical Communication, Fiber Optic Networks, Digital Communication.

- **Undergraduate Theory Subjects Taught**: Optical Communication, Digital Communication, Data Communication, Modern Communication Systems, Analog Communication, Pulse and Digital Circuits, Electrical Circuit Theory, Electronic Devices, Basic Electronics.
- **Postgraduate and Undergraduate Laboratory Classes**: Fiber Optics, Digital Communication, Analog Communication, Design and Simulation of Communication Systems and Networks, Pulse and Digital Circuits, Linear Circuits, Basic Electronics.
- **New Theory Subjects Introduced**: Advanced Optical Communication, Optical Networks.
- **Laboratories Developed (Undergraduate and Postgraduate Classes)**: Telecommunication Networks Laboratory, Fiber Optic Systems Laboratory, Communication Systems Laboratory, Design and Simulation Laboratory (Optical Communication Systems and Networks), Electrical Networks Laboratory, Basic Electronics Laboratory.
- **Training for Laboratory Staff**: Basic Electronics, Fiber Optics, Campus Networking.
- **Short term courses and R&D Orientation/Training Programs:** Conducted several one-week courses for industry engineers and faculty members from other engineering colleges in the area of optical and wireless networks.
- **At Stanford University, USA:** Taught in the Department of Electrical Engineering along with the host faculty at postgraduate level (Masters and PhD students); Subjects taught: Optical Communications, Advanced Optical Communications.
- **At University of California, Davis**: Mentored/co-advised/lectured for doctoral students of Optical Networks Group, during research collaboration on optical networks in the Department of Computer science.
- **At Chonbuk National University, South Korea:** Taught Optical Networks at postgraduate level (Masters and PhD students) in the Department of Computer Engineering.
- **At University of Malaya:** Taught Electronic Devices and Optical Communications and Optoelectronics at undergraduate level in the Department of Electrical Engineering.