Prahlad T. Kulkarni

(I) Education

- **Ph.D. in Electrical and Electronics Engineering**, Indian Institute of Technology, Kharagpur, India. **Thesis title: "Studies on the performance of multiwavelength lightwave networks"** **Thesis advisor:** Dr. Ranjan Gangopadhyay, IIT Kharagpur.
- **M.Tech. in Electrical and Electronics Engineering,** Indian Institute of Technology, Kharagpur, India (CGPA: 8.85/10.0). **Thesis title: "Design and Implementation of Spread Spectrum System using Nonlinear Codes"** **Thesis advisor:** Dr. S. L. Maskara, IIT Kharagpur.
- **B.E. Electronics and communication engineering,** Karnataka University, Dharwad, (First Class).

Technology Area of Research: Optical Networks, Wireless Communication

(II) Teaching Experience

i) Visiting Professor : Chonbuk National University, Jeonju, S. Korea and Scoula Superiori Sant Anna, Pisa, Italy

ii) Principal : 7 Years (Pune Institute of Computer Technology Pune and Dayananda Sagar College of Engineering Bangalore)

iii) Professor & Head : 5 Years (PES Institute of Technology, Bangalore, SDM college of Engineering & Technology, Dharwad)

iv) Asst. Professor & Lecturer : 20 Years (PDA College of Engineering Gulbarga, Gogte Institute of Technology Belgaum)

v) Industry : 2 Years (ITI Ltd. Bangalore, Eagle Electronics)

(III) Research Activity

- *Application of Dirty Paper Coding in MIMO (& Compact MIMO) Systems: The dirty paper channel model indicates that lossless precoding is theoretically possible at any signal-to-noise ratio (SNR), and thus it may serve as a basic building block in both single-user and multiuser communication systems. The dirty paper channel model for Low-Density Parity-Check (LDPC) coded additive white Gaussian noise (AWGN) channels and Rayleigh fading channels, is proposed – This work is published in* International conference on Electrical and Computer Engineering **(ICECE 2006)**, International Conference on Communication and Computer Networks **(CCN 2006), and** *ICCSNA-2010, Hong Kong***.**

- *Threshold Based Energy Efficient Adaptive Cluster Head Selection Protocol: This work is published in International conference on Convergence of Science and Engineering (**ICSE-2010), Bangalore.*

- *Constraint based routing: The transmission impairments (linear and non-linear) may make some routes unusable thereby severely limiting the performance of the network. The BER information is used to optimize the routing decision -This work is published in proc. International Workshop on Multimedia Signal Processing and Transmission, MSPT, Oct. 2005.*

- *Limitations Imposed by Transmission impairments in the optical networks: The impact of transmission impairments on the performance of regular two-connected optical mesh (torus) network is assessed using different routing schemes (This work has been supported partially by Marconi through an annual grant to Scoula Superiore Sant' Anna, Italy) - This work is published in: IASTED International Conference on Computer Communication, MIT, USA, Nov. 8-10, 2004.*

- *Throughput performance of multiwavelength shufflenet with and without wavelength conversion: The analysis and the extensive simulations are performed to assess the benefit of multichannel operation under uniform traffic using different routing schemes.The performance of the network is evaluated with and without wavelength conversion - This work is published in: Journal of Opt. Commun., Vol, 2/2003.*

- *Performance evaluation of multichannel linked cluster lightwave networks: The proposed linked-cluster multichannel lightwave network interconnects clusters of shufflenet by a shufflenet backbone. The network throughput and mean queuing delay are found. - This work is published in Journal of Opt. Commun., Vol, 19, 1998, pp. 185-189.*

- *Impact of link failures on the performance of multihop lightwave networks: The impact of link failures on the performance of multihop lightwave networks such as Shufflenet and Hypercube is evaluated. The simulation study is also done for dynamic wavelength routing networks. - This work is published in Computer Communication 21 (1998), pp 179-185.*

- *Impact of channel impairments in a switched WDM networks: The physical layer design of a wavelength-routed optical network considering the pertinent physical channel impairments has been addressed. The maximum number of nodes is determined considering FWM, ASE and switch crosstalk. - This work is published in: a) Proc. Int. Conf. on Computers, Devices, & Communication, 1998, pp. 207-210. b) Proc. IEEE LEOS 97, Vol, 2. 1997, pp. 468-469.*

- *Transmission performance of multiwavelength ring networks: The performance evaluation of multiwavelength ring networks (with logical topologies such as p-ring, wheelnet, smartnet) has been carried out by simulation and their respective merits and deficiencies are highlighted. - This work is published in: Proc. APCC/ICCS 98 Conference, Singapore, 1998.*

- *Design of Spread spectrum antijam communication system using nonlinear codes: The performance of spread spectrum system has been evaluated (experimentally) under jamming. It is found that the system offers a jamming marjin of 6.5 dB which is 1.5 dB less than the theoretical jamming margin of 8dB - This work is published in: Proc. National symposium on physics of electronic communication, Dec. 1987, pp. 48-50.*

(IV) **Publications**

1. **Srinivas Babu and Prahlad Kulkarni,**"TCP in Optical Burst Switching Environment," Journal of computational and Theoretical Nanoscience, Volume 15, 2018 (ISSN 1546-1955; Scopus indexed American Scientific Publishers).

2. Sayed Abdulhayan and Prahlad Kulkarni, "MAC Scheduling Strategies in LTE Advanced," Journal of Telecommunication Study, Volume 3, Issue 1, 2017.

3. **Srinivas Babu and Prahlad T. Kulkarni** "Comprehensive Study of Different ROF Modulation Schemes in Optical Fiber Communication," **GRENZE International Journal of Computer Theory and Engineering (GIJCTE), Volume 3, Issue 4, Page 279, 2017** (ISSN: 2455-1694).

4. Siddlingappagouda Biradar and Prahlad T. Kulkarni, "Simulation and Analysis of AODV and AOMDV Protocol during Link Breakage in MANETs using NS-2," ACEEE International Journal on Communication System, vol. 1, pp. 124-300, May 2014 (ISSN2158-7558).

5. Siddlingappagouda Biradar and Prahlad T. Kulkarni, "Simulation and Comparison of Energy Efficient Routing Protocols in MANETs using NS-2," International Journal of Advanced Research

in Computer Engineering & Technology(IJARCET),vol. 3, Issue 4, April 2014, pp. 231-237 (ISSN: 2278-1323).

6. Sayed Abdulhayan, Prahlad T. Kulkarni, and Ravindra D. Noubade, "Comparative study of Priority-based Scheduler with Basic Schedulers in LTE-Advanced", IJEIT Vol. 3, Issue 1, July 2013 (ISSN 2277-3754).

7. Sayed Abdulhayan , P. T. Kulkarni "Priority-based Scheduler in LTE-Advanced" International Journal of Research in Wireless Systems (IJRWS), Vol. 2, issue3, pp. 12-22, October,2013.

8. Sayed Abdulhayan , P. T. Kulkarni"Performance of Priority-based Scheduler in LTE-Advanced for Propagation Models" International Journal of Scientific and Research (IJSRP), Volume 3, Issue 7, July 2013(ISSN 2250-3153).

9. Sayed Abdulhayan , P. T. Kulkarni"Performance of Priority-based Scheduler in LTE-Advanced for Coded Models" International Journal of Scientific and Research (IJSRP), Volume 3, Issue 6, June 2013 (ISSN 2250-3153).

10. Sayed Abdulhayan , P. T. Kulkarni"Performance of Priority-based Scheduler in LTE-Advanced for Channel Models" International journal of Engineering and innovative technology (IJEIT), Volume 2, Issue 10, April 2013 (ISSN 2277-3754).

11. Sayed Abdulhayan , P. T. Kulkarni"Comparison of Priority-based two-level Schedulers in LTE-Advanced" International Journal of Scientific and Research (IJSRP), Volume 3 Issue 7 July 2013(ISSN 2250-3153).

12. Vinod B Durdi, Prahlad T. Kulkarni, and K. L. Sudha,"Robust Video Transmission over Wireless Networks Using Cross Layer Approach," *Journal of Industrial and Intelligent Information,* Vol. 1, No. 2, pp 97-101, June 2013, *(*ISSN: 2301-3745; http://www.jiii.org/index.php?m=content&c=index&a=show&catid=32&id=41, Citation Index: 5).

13. Sayed Abdulhayan, P. T. Kulkarni, Padmanaban Ramasamy "MAC Scheduling Strategies in LTE Advance" International Journal of Research and Reviews in Wireless Communications (IJRRWC), Vol 2, No. 3, pp. 104-111, 2012.

14. Vinod Durdi, P. T. Kulkarni, Sudha K. L. " Robost video Transmission over wireless network using cross layer approach" International conference on Fuzzy and Information Engineering (ICFIE 2013).

15. Sayed Abdulhayan, P. T. Kulkarni, Padmanaban Ramasamy "MAC Scheduling Strategies in LTE Advance" International Journal of Research and Reviews in Wireless Communications (IJRRWC), Vol 2, No. 3, pp. 104-111, 2012.

16. Sayed Abdulhayan , P. T. Kulkarni "Priority-based Scheduler in LTE-Advanced" International Journal of Research in Wireless Systems (IJRWS), Vol. 2, issue3, pp. 12-22, October,2013.

17. Sayed Abdulhayan , P. T. Kulkarni "Performance of Priority-based Scheduler in LTE-Advanced for Propagation Models" International Journal of Scientific and Research (IJSRP), Volume 3, Issue 7, July 2013.

18. Sayed Abdulhayan , P. T. Kulkarni "Performance of Priority-based Scheduler in LTE-Advanced for Coded Models" International Journal of Scientific and Research (IJSRP), Volume 3, Issue 6, June 2013.

19. Sayed Abdulhayan , P. T. Kulkarni "Performance of Priority-based Scheduler in LTE-Advanced for Channel Models" International journal of Engineering and innovative technology (IJEIT), Volume 2, Issue 10, April 2013.

20. Sayed Abdulhayan , P. T. Kulkarni "Comparison of Priority-based two-level Schedulers in LTE-Advanced" International Journal of Scientific and Research (IJSRP), Volume 3 Issue 7 July 2013

21. Sayed Abdulhayan , P. T. Kulkarni "Comparative study of Priority-based Scheduler with Basic Schedulers in LTE-Advanced" International journal of Engineering and innovative technology (IJEIT), in Volume 3, Issue 1, July 2013

22. S K Padaganur, Siddlingappagouda C Biradar, P T Kulkarni "Performance Evaluation and Comparison of AODV and AOMDV Routing Protocol in Grid Environment Using NS-2" C2SPCA-2013

23. Siddlingappagouda C Biradar, P. T. Kulkarni "Performance Analysis of AODV Routing Protocol for Wireless Senor Network with NS2" "has accepted for publication in "International Journal of Wireless Communications and Networking (IJWCN)" July-Dec 2012.

24. Siddlingappagouda C. Biradar , Prahlad T. Kulkarni, "Performance Evaluation of DSR Routing Protocol in Grid Environment", has accepted for publication in "International Journal of Emerging Technologies and Applications in Engineering Technology and Sciences (IJ-ETA-ETS) ", Volume 5 , Issue 2, July-Dec 2012.

25. Siddlingappagouda C. Biradar , Prahlad T. Kulkarni, "Simulation and Comparison of AODV, DSR and DSDV Routing Protocols in MANETs " National Conference on Emerging Trends in Information Technology, Bangalore, March 2011

26. Gopalsharma R. Joshi, Vinod kumar, M. Ravindra and P. T. Kulkarni "Deep Level Transition Spectroscopy (DLTS) and Annealing studies in Gamma Irradiated Bipolar Junction Transistors" 18th International Conference on Composites or Nano Engineering being held at Anchorage, Alaska, USA from July 4-10, 2010

27. Smitha Sasi, Mrs.Pranathi Gopal, and P. T. Kulkarni " Design and Implementation of CFDP over IP over CCSDS Space links", accepted for publication in Journal of space technology, ISRO, Bangalore.

28. Adithya Kumar M.J, Ajith Bhat H.L, Anil M.V, Prahlad T. Kulkarni "Dirty Paper Coding- A novel approach for compact MIMO systems", Second International Conference on Communication Systems, Networking and Applications (ICCSNA-2010), Hong Kong.

29. Mahesh Dali, Jayanthi K. Murthy, Bharath kumar. C, Bharath kumar. K M, Gaurav. B. B, Prahalad T. Kulkarni, "Threshold Based Energy Efficient Adaptive Cluster Head Selection Protocol" International conference on Convergence of Science and Engineering (ICSE-2010), Bangalore.

30. Gopalsharma R. Joshi, Vinod kumar, M. Ravindra and P. T. Kulkarni "An empirical model for Total Ionizing Dose degradation in Bipolar Junction Transistors" International conference on Convergence of Science and Engineering (ICSE-2010), Bangalore.

31. Gopalsharma R. Joshi, Vinod kumar, M. Ravindra and P. T. Kulkarni, "Gain Degradation of Bipolar Junction Transistors in Enhanced Low Dose Rate Environment" National Conference on Challenges in Micro / Nano Electronics, CMNE – 2010, India.

32. Prahlad T Kulkarni, Moon Ho Lee, Jia Hou, and Ram Prasad Paudel "Performance analysis of Dirty-Paper Coding over MMO Keyhole Channels", International conference on Electrical and Computer Engineering (ICECE 2006), Dec 2006, Dhaka, Bangladesh, pp. 402-407.

33. Prahlad T Kulkarni, Moon Ho Lee, and Subash Pokhre "On Application of LDPC Codes for Dirty-paper Fading Channels", IASTED International Conference on Communication and Computer Networks (CCN 2006), 4-6 Oct. 2006, Lima, Peru.

34. R.N. Mohan and Pralhad T. Kulkarni "A New Fault-Tolerant M-network and its Analysis," Computer Science Abstract, April 2006.

35. R.N. Mohan, Pralhad T. Kulkarni, and Moon Ho Lee "A new family of fault-tolerant M-networks," The 4th International Workshop on Multimedia Signal Processing and Transmission (MSPT), Feb. 2006, S. Korea. pp. 93 - 104.

36. Prahlad Kulkarni Moon Ho Lee, and Harsha Patil "Transmission Impairments Aware Routing for Optical Networks," The 4th International Workshop on Multimedia Signal Processing and Transmission (MSPT), Feb. 2006, S. Korea. pp. 105 - 112.

37. Moon Ho Lee, Prahlad T. Kulkarni, Jia Hou, and Subash Pokhrel "Writing on Dirty-Paper Fading Channels Using LDPC Codes." The 4th International Workshop on Multimedia Signal Processing and Transmission (MSPT), Feb. 2006, S. Korea. pp. 113 - 118.

38. Moon Ho Lee Prahlad T. Kulkarni, Jia Hou, and Ram Prasad Paudel "On the Application of Dirty-Paper Coding to MIMO Keyhole Channels", The 4th International Workshop on Multimedia Signal Processing and Transmission (MSPT), Feb. 2006, S. Korea. pp. 119 - 127.

39. Prahlad T. Kulkarni, Piero Castoldi and Giancarlo Prati, "Limitations Imposed by Transmission Impairments in the Optical Networks," ACTA Press, Canada (2006).

40. Moon Ho Lee and Prahlad T. Kulkarni, "Constraint-based Routing for Optical Networks" International Workshop on Multimedia Signal Processing and Transmission (MSPT), Oct. 2005, Jeonju, S. Korea. pp. 57- 60.

41. Prahlad T. Kulkarni, Piero Castoldi and Giancarlo Prati, "Limitations Imposed by Transmission Impairments in the Optical Networks", IASTED International Conference on Communication and Computer Networks (CCN 04), 8-10 Nov. 2004, MIT, USA, pp. 1-16)

42. P. T. Kulkarni, A. Bononi, R. Gangopadhyay, "Throughput Performance of Multiwavelength Shufflenet with/without Wavelength Conversion," Journal of Optical Communications, 24 (2003) 2, pp. 42-49.

43. N. M. Shetty, N. H. Ayachit and P. T. Kulkarni, "Waveguide coupled micro strip-A new approach," Instrumentation Society of India (NSI 28), July 2003.

44. P. T. Kulkarni, Rekha Dundur, and Aruna Naik "Performance of Multihop lightwave Networks with hot-potato routing and limited wavelength conversion," National conference on Innovations in Information & Communication Technology (NCIICT 2003), Mar, 2003, pp. 89-93.

45. P. T. Kulkarni and Aruna Naik, "Performance of Shufflenet with wavelength conversion under link failures," National Conference on Advanced Computing (NCAC 2003), Feb. 2003, pp. 1-10.

46. P. T. Kulkarni and Rekha Dundur, "Performance of Multiwavelength lightwave Network with limited wavelength conversion," National conference on Advanced Computing (NCAC 2003), Feb. 2003 (Awarded as "Best Paper").

47. Kulkarni P.T.; Gangopadhyay R. and Datta D. "Impact of link failures on the performance of multihop lightwave networks," Computer Communications (Elsevier), Volume 21, Number 2, 1 March 1998, pp. 179-185

48. P. T. Kulkarni, D. Datta and R. Gangopadhyay, "Performance Evaluation of multichannel linked-cluster Lightwave Network". Journal of Opt. Commun., Vol, 19, 1998, pp. 185-189.

49. R. Gangopadhyay, D.Ghosh and P T Kulkarni, "Impact of four Wave mixing in a dense WDM Switched Optical Network, "in Proc. Int. Conf on Computers and Devices for Communications (CODEC), 1998, pp.207-210.

50. R. Gangopadhyay, A. Nasipuri, G. Gopalkrishna and P. T. Kulkarni, "Transmission Performance of multiwavelength Ring Network with Embedded Logical wheel," in Proc. APCC/ICCS 98 Conference, Singpore, 1998.

51. R. Gangopadhyay, D.Ghose and P. T. Kulkarni, "Efficient Computation of four wave mixing power in a switched WDM network," IEEE LEOS 97, Vol. 2, 1997, pp. 154-155.

52. R.Gangopadhyay, P.T. Kulkarni and A.Bononi, "Throughput performance of Multiwavelength shufflenet with and without wavelength conversion," Proc. IEEE LEOS 97, Vol. 2, 1997, pp. 468-469.

53. P. T. Kulkarni, D. Datta and R.. Gangopadhyay, "Performance Evaluation of Multichannel Linked-Cluster Shufflenet," in Proc. NCC 96, Feb. 1996, pp. 105-107.

54. P. T. Kulkarni, S. L. Maskara, and S. Shanmugavelu "Spread Spectrum Antijam Communication system Design using Nonlinear Codes," in Proc. National symposium on physics of electronics communication, Dec. 1987, pp. 48-50.

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55. Pralhad Kulkarni and R.N. Mohan "M-networks - An efficient class of interconnection networks", Submitted to Indian Journal of pure and applied mathematics.

56. Prahlad T. Kulkarni, Moon Ho Lee and Jia Hou "On the Application of Dirty-Paper Coding to MIMO Keyhole Systems", to be submitted to IEEE Trans. Communication.

57. Prahlad T. Kulkarni, Moon Ho Lee and Jia Hou "Writing on Dirty-Paper Fading Channels Using LDPC Codes." Submitted to IEE (Review received and it is to be resubmitted).

58. Prahlaad Kulkarni and R.N.Mohan "Some new M.networks," Submitted to IEEE Transactions on computers (Review received and it is to be resubmitted).

59. P T Kulkarni and Prof. Kiyotoshi Yasumoto, "Modeling & statistical characterisation of satellite communication channel for future broadband and quality of service conscious applications," - Proposal accepted by Kyushu University, Japan (2007).

60. P.T.Kulkarni and Prof. Hwang "Robust Video coding and transmission over cooperative wireless sensor network," - Proposal accepted by Kunsan National University, Korea (2007).

61. Moon Ho Lee, Prahlad T Kulkarni, Jai Hou, and Subash S. Pokrel "On the Application of Dirty-Paper Coding to MIMO Keyhole Systems" - To be Submitted.

(V) PROFESSIONAL DEVELOPMENT

- Invited by Prof. Kiyotoshi Yasumoto of **Kyushu University, Fukuoka, Japan**, to participate in a joint project in "Satellite Communication Technology".
- Invited by Prof. Jae Jeong Hwang of **Kunsan National University. Kunsan, S. Korea** to participate in a joint project on "Robust video coding and transmission over cooperative wireless sensor network"
- Served as TPC member in "Asia Pacific Communication Conference (APCC) 2009 & Chaired the Technical sessions.), Sep, 2009**, Shanghai. China.**
- Chaired Technical session of International Workshop on Multimedia Signal Processing and Transmission (MSPT), Oct. 2005**, S. Korea.**.
- Invited to deliver a "Invited talk" at International conference (Dec. 2006), **NPL, New Delhi.**
- Served as a Visiting Professor (Sep. 2005 – Feb. 2006) in Chonbuk National University**, S. Korea**.
- Served as a Visiting Professor (January 2004 -April 2004) in **SSUP, Pisa University, Pisa, Italy**.
- Delivered Seminars on "Wireless Communication" at **Chonbuk National University**, **S Korea**
- Presented a Paper at International Conference on Computer Communication, **MIT, USA**

- Chairman BOE (Electronics & Comm. Engineering), Gulbarga University

- Member, Board of Examination, Visveswaraya Technical University, Belgaum
- Member Board of studies, Karnataka University
- Member, LIC, Visveswaraya Technical University, Belgaum.
- Invited to participate in Indo-US Leadership Institute (IUCEE)
- Attended many conferences/workshops/short-term courses.
- Conducted Seminars/workshops.
- Guided many UG/PG projects.
- Participated in many sponsored/consultancy projects.

(VI) PROFESSIONAL/ACADEMIC HONORS AND AWARDS

- **Senior Member, IEEE**
- **Member IEEE LEOS**
- **Member ACM**
- **Life Member, ISTE**
- **Fellow, IETE**
- **Fellow, IE**
- Served as a **reviewer** for **IEEE Transactions on Parallel and Distributed Systems**.
- Served as a **reviewer** for **IEEE Transactions on Computers**
- Received an **appreciation from Station Engineer**, Doordarshan Gulbarga for developing Kannada character generator for Doordarshan Kendra Gulbarga.
- Received "*Best Paper*" award in National conference on Advanced Computing,
- Received awards such as **"American Medal of Honor"**, the **"Man of the year-2003"** by American Biographical Institute Inc, member of American Biographical Institute Inc's **"Distinguished research board of advisors"**,
- Included in contemporary, who's who, **"Jewel of India award"**, **"Rashtriya Shiksha ratna"**, "**Shiksha Rattan Puraskar**".
- Served as an active member of Lion's club

(VII) ASSIGNMENTS/VISITS ABROAD:

USA, Italy, France, Germany, Singapore, Korea, China, Dubai

(VIII) PERSONAL INFORMATION

Date of Birth   : 11TH AUGUST 1955

Sex   : Male

Nationality   : Indian

Marital Status   : Married

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(IX) <u>REFERENCES</u>

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