

# Dr. Syed Mohammad Hassan Zaidi

## Personal Details

Date & Place of Birth: 26 Dec 1961, Pakistan  
Citizenship: Pakistani  
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## Education

- **PhD** *Computer Simulation of High Speed Communication Networks (December 1992).*  
University of South Florida, Tampa, Florida 33620, USA  
**Title:** A Coherent Optical Fiber Communication System Characterized by Ultra-low Photons per bit.
- **MS** *Electrical Engineering (December 1989)*  
University of South Florida, Tampa, Florida 33620, USA .  
**Title:** Optimization of an Optical FSK Heterodyne Modulation System
- *Honours Graduate – Senior Command and Staff Course (November 1998)*  
Air War College, Faisal – Karachi, Pakistan
- **BE - Aeronautical Engineering (January 1984)**  
College of Aeronautical Engineering, Karachi, Pakistan

## Publications/Research Papers

- **Book Chapters :** Contributed Two Chapters in the book of “Fiber Optic Communications Systems, Analysis, and Enhancements”, McGraw-Hill Telecommunications
- **Research Papers Published in Journals/Conferences etc** **100**

## Honours & Awards

- President’s Pride of Performance Award for the year of 2008
- XVIIIITH Star Award 2007
- NUST’s Best Researcher for the Year 2007
- NUST’s Best Teacher for the Year 2007
- Duke Energy Distinguished Visiting Research Scholar at Optics Center of Charlotte Research Institute at University of North Carolina at Charlotte, USA – (July-Sept 2006)

- 11<sup>th</sup> Pakistan Education Forum's National Education Award 2005 - for meritorious services in the field of Computer Science and Information Technology.
- HEC Best University Teacher Award for the year 2004
- NCR Excellence Awards on IT Educationalist 2003
- Commendation Certificate by Chief of the Air Staff for devotion to duty and valuable services rendered to the Pakistan Air Force. (March 2002)
- NCR Excellence Awards on IT Research and development 2000-2001
- Letter of Appreciation from Commandant CAE, NUST for delivering 3 outstanding seminars on "Laser Fundamentals and its Military Applications, Thermal Imaging Systems (FLIRS) and Infra-Red Satellite Reconnaissance" 1994
- Graduate Teaching Fellowship (University of South Florida USA) 1991 - 1993
- Graduate Research Fellowship (University of South Florida USA) 1988 - 1991
- Ministry of Science and Technology Scholarship for MS/PhD studies 1998 - 1991
- Board of Intermediate Scholarship for outstanding performance in Intermediate exams for Pre-Engineering group. 1980

### **Professional Development Courses/Workshops**

- Training Course/Workshop on Virtual Library and Network Information Systems (Beijing, China) May 2001
- Faculty Refresher Course in Software Engineering (Pearl Continental, Rawalpindi) May 2000
- Internetworking with TCP/IP Computer 2000, Microsoft CTECH Dubai July 99
- Training Course/Workshop on Exploitation and Utilization of Scientific and Technical Information Resources (Beijing China) May 98
- ISO 9000 Lead Auditor Course (thru IRCA Registered German Company) Aug 97
- Computer Simulation of Communication Systems Bell Communications Research, Navesink Research and Engineering Center, Red Bank, New Jersey, USA Aug 92
- Pattern Recognition and Analysis Computer Science and Engg Dept, University of South Florida, Tampa USA July 91

- Fuzzy Logic Design March 90  
Computer Science and Engg Dept, University of South Florida, Tampa USA
- Training with Perkins & Elmer - Connecticut, USA April 86  
On spectrometric oil analysis and associated electronic instrumentation.

### **Prestigious Memberships**

- Member Institute of Electrical & Electronics Engineering (IEEE)
- Member working Group on IT Human Resource Development, National IT Policy- 2000
- Member Specialist Committee on IT Curriculum Development formulated by the Minister of Science and Technology 2000
- Co-Opted Member of Sub-Committee on “Telecom Infrastructure development for IT” (Committee on national IT Policy formulation) 1998

### **Keynote/Lead Speaker/Chairperson/Chief Guest Addresses**

- Presented the Research/IT Profile of NUST/NIIT in the following top world class universities: (Nov – Dec 2006)
  - ❖ Massachusetts Institute of Technology (MIT) , USA
  - ❖ University of California at Berkeley (UC Berkeley), USA
  - ❖ Caltech, USA
  - ❖ Stanford University, USA
  - ❖ Imperial College London, UK
  - ❖ The University of Manchester, UK
  - ❖ University of Warwick, UK
  - ❖ University of the West of England (UWE) Bristol, UK
  - ❖ College of Information Technology at Al Ain University, UAE
  - ❖ American University of Sharjah, UAE
- Gave a presentation on “Craft of Research” on 24 Sep 2007 at NIIT Pakistan.
- Keynote Presentation on “Broadband Access Technology Evolution Patterns: Strategy and Recommendations for the Asian Region” in One day International workshop on “Connection Oriented Networks, MPLS, GMPLS and Optical Networks” held on 26<sup>th</sup> Apr 2007 at NIIT, Pakistan.
- Presentation on “How to Effectively Read a Scientific Paper” in Two days International workshop on “Developing Research Culture” held on 12 -13 March 2007 at NIIT, Pakistan.
- Gave a presentation on Up-to-date Research/IT Profile of NUST/NIIT to the delegation of University of Leeds, UK at NIIT in Mar 2007.
- Gave a detailed presentation to the delegate of University of Glasgow at NIIT on “Design of High Speed Access Network at NUST new campus at Islamabad”, in Feb 2007.
- Presented Up-to-date Research/IT Profile of NUST/NIIT to French Delegation during their visit to NIIT on 16<sup>th</sup> Feb 2007.
- R & D at NUST Institute of IT in the area of Photonics Networks - Optics Center – UNC Charlotte, 31<sup>st</sup> Aug 2006.
- Emerging Trends in Optical Networks at Pakistan Computer Society in Mar 2006-06
- Presentation on “Review of Research activities at NUST” at University of North Carolina at Charlotte (UNCC), USA in Dec 2005.
- Review of some core areas in Information Technology at Civil Services Academy in Oct 2005
- Role of IT in Medicine at Ayub Medical College Abbottabad – June 2000
- JAVA Seminar at Pakistan Academy of Sciences Auditorium Islamabad – March 2000
- E Commerce Seminar at ICMA Islamabad – March 2000
- E-Commerce Seminar at HQ NUST – Jan 2000
- Microsoft Certification Courses Seminar organized at HQ NUST – April 1999

- Post Graduate Diploma in Information Technology Seminar at HQ NUST – Sept 1999
- ISO 9000 Seminar at Marriott Islamabad – June 1998
- IT Education in NUST Pakistan at Beijing China - May 1998
- Presented NUST R&D Projects to IDB Senior Management team at PCST Islamabad - 1997

## ❖ Work Experience

### *Academic Contributions*

- **Dean** – NUST Institute of Information Technology (NIIT), Rawalpindi. **Feb 2005 – To date**  
**Major Responsibilities:** To Plan, co-ordinate and supervise all academic activities including:
  - a. Curriculum Development
  - b. Teaching
  - c. International Linkages
  - d. University/Industry Linkages

#### *a. Curriculum Development*

- ❖ Designed a comprehensive course of “Research Methodologies” at Postgraduate level with the help of foreign experts namely Dr. Richard McClatchy and Dr. Tony Solomonides from University of West of England (UWE) and delivered this course at NIIT to postgraduate level students.
- ❖ Head of the NIIT Curriculum Review Committee (CRC). In this capacity, formulated the curriculum for the following degree programs:
  - a. PhD in Information Technology
  - b. Master in Information Technology (MS IT)
  - c. Bachelor in Information Technology (BIT)
  - d. Bachelor in Information and Communication Systems Engineering (BICSE)
  - e. Bachelor in Electronics Engineering (BEE)
- ❖ Played a key role in acquiring the Optisim Software worth \$15000, for the Photonics Research Lab at NIIT. On the basis of this software, number of Postgraduate students are doing research in their PhD & Master’s thesis and Undergraduate students in their final year projects.

#### *b. Teaching*

- **Professor:** NUST Institute of Information Technology, National University of Sciences and Technology, Rawalpindi - Pakistan. 1999 – To date

#### **Courses Taught:**

- ❖ Advanced Data Communications & Security
- ❖ Photonics Networks
- ❖ Digital Communication Systems
- ❖ Fiber Optic Communication Systems
- ❖ Data Communications and security
- ❖ E-commerce
- ❖ Introduction to Information and Communication Technologies (ICT)
- ❖ Research Methods

- **Adjunct Faculty:** Department of Electrical Engineering, College of Telecommunication Engineering, National University of Sciences and Technology, Rawalpindi - Pakistan. July 1996 – 1999

**Courses Taught:**

- ❖ Digital and Analog Communication Systems
  - ❖ Stochastic Processes
  - ❖ Digital Signal Processing (Postgraduate level).
- **Associate Professor:** Avionics Engineering Department, College of Aeronautical Engineering, National University of Sciences and Technology, Pakistan. July 1993 – July 1996.

**Courses Taught:**

- ❖ Digital and analog Communication Systems
  - ❖ Microwave Devices for Communications and Radars
  - ❖ Introduction to Radar Systems
  - ❖ Laser Communications
  - ❖ Digital Signal processing
  - ❖ Introduction to Fiber-Optic Communications
  - ❖ C Programming.
- **Adjunct Faculty:** Department of Electrical Engineering, University of South Florida, Tampa, USA Jan 1993 – June 1993
  - **Teaching Associate:** Department of Electrical Engineering, University of South Florida, Tampa, USA. August 1991 – Jan 1993.

**Courses Assisted:**

- ❖ Communication Systems
  - ❖ Linear System Analysis
  - ❖ Optoelectronics (with Professor Gerard Lachs)
- **Adjunct Faculty** F-16 Field Training Detachment, Pakistan. Jan 85 – Dec 1987

**c. International Linkages**

- ❖ Played a key role in forging high-level international research collaborations of NUST Institute of IT (NIIT). For this purpose, visited some of the top US and British universities including Massachusetts Institute of Technology (MIT), University of California at Berkeley, Stanford University, Caltech, University of South Florida, Imperial College London, University of Manchester and University of Warwick, as a part of high level delegation of NUST led by Rector NUST. Made comprehensive presentations covering the entire spectrum of ongoing research programs with world-class universities which had an increasingly positive effect on the deliberations held with host institutions. The understanding and rapport developed between the two sides also led to drawing up some key action plans with a view to paving the way for a range of joint research and collaborative activities. to establish university-university linkages and attract research projects. Specifically, established linkages with the following foreign faculty in order to attract collaborative research projects for NIIT:

- a. Dr. Leonid G Kazovsky, Professor of Electrical Engineering from Stanford University in the area of Optical Networks.
  - b. Dr. Mirsad Hadzikadic, Dean of College of Computing and Informatics UNCC, USA in the area of Complex Adaptive Systems & Bio- informatics research
  - c. Dr. Arslan of the University of South Florida, USA in the area of Ultra wide band communication.
  - d. Dr. Chris Frekredis of the University of South Florida, USA in the area of Solar Cells research.
  - e. Dr. Michael Fiddy, Director, Center for Optoelectronics, Dr. Yasin Raja, Associate Professor and and Dr. Faramorz Frahi of University of North Carolina at Charlotte (UNCC), USA in the area of Optical Networks research.
  - f. Dr. Teresa of UNCC, USA in the area of Sensor Networks research.
  - g. Dr. Nasir Ghani, Professor in Department of Electrical and Computer Engineering of Tennessee Tech University in the area of Optical Networks.
  - h. Dr. Nasir Rajpoot, Assistant Professor from University of Warwick in the area of image processing.
  - j. Dr. Nigel Baker from University of West of England (UWE) in the area of Mobile Computing and Wireless Networks.
  - k. Dr. Richard from University of West of England (UWE) in the area of Grid Computing.
- ❖ **International Co-Chair:** Designated as International Co-Chair for US Pakistan International Symposium on “High Capacity Optical Networks and Enabling Technologies (HONET)”. Being International Co-Chair, arranged HONET in 2004 and 2005 at Marriott Hotel Islamabad in Collaboration with University of North Carolina at Charlotte. In Sep 2006, the same event was arranged at University of North Carolina at Charlotte, USA and in the Nov 2007 at Hotel Madinat Jumeirah, Dubai, in the Dec 2008 this event held in Malaysia and the series of event held in the Dec 2009 and 2010 in Egypt.
  - ❖ **Workshop Chair:** Designated as Workshop Chair for:  
One day international workshop on “Connection Oriented Networks, MPLS, GMPLS and Optical Networks” held at NUST Institute of Information Technology, Pakistan on 26<sup>th</sup> April 2007.
  - ❖ One day international workshop on “Advanced Network Technologies” held on 20<sup>th</sup> Dec 2003 at Rawalpindi.

**d. University/Industry Linkages**

- ❖ Presentation on “How to Effectively Read a Scientific Paper” in Two days workshop on “Developing Research Culture” held on 12 -13 March 2007.
- ❖ Presented Up-to-date Research/IT Profile of NUST/NIIT to French Delegation during their visit to NIIT on 16th Feb 2007.
- ❖ Gave a detailed presentation to the delegate of University of Glasgow on “Design of High Speed Access Network at NUST new campus at Islamabad”.
- ❖ Gave a presentation on Up-to-date Research/IT Profile of NUST/NIIT to the delegation of University of Leeds, UK.
- ❖ Given a comprehensive briefing about the academic and research activities and the facilities available/strength of NUST in the area of information technology at NUST in general and NIIT in particular to the CISCO experts in Jan 2007. The purpose of the briefing was to apprise CISCO experts for establishing a customer support Training Lab Facility in NUST/Pakistan.
- ❖ Prepared a detailed presentation/briefing about the various academic programs and research activities being carried out at NIIT/NUST for the Dr. Arden L. Bement, Director, National Science Foundation (NSF) for acquiring research grant.

- ❖ Presented the profile of NUST/NIIT before the representatives of IBM for establishing Industry and University Partnership.
- ❖ Senior member of Corporate Advisory Council (CAC) for IT & Communication/Engineering related programs. CAC comprises members from NUST and local industry (Tech Access, Netsol, CISCO, Nayatel & East West Infinity etc)
- ❖ Head of the organizing committee for organizing a One day international workshop on “Connection Oriented Networks, MPLS, GMPLS and Optical Networks” held at NIIT, Pakistan on 26<sup>th</sup> April 2007.
- ❖ Head of the organizing committee for the Undergraduate Convocation to be held in March 2007.
- ❖ Senior Member of the Organizing Committee of All Pakistan Software Competition N@stec 2006 held on 23<sup>rd</sup> – 24<sup>th</sup> Dec, 2006.
- ❖ Senior Member of the organizing committee of the International Workshop on Multi Agent Systems and Semantic Grid 2006 held on 16<sup>th</sup> Dec 2006.
- ❖ Senior Member of the Organizing Committee of the Workshop on PCB Design and Manufacturing held on 6<sup>th</sup> Nov 2006.
- ❖ Senior Member of the Organizing Committee of 4 days Workshop on Semantic Web & Web Engineering held on 31 Jan 2006 to 03 Feb 2006.
- ❖ Senior member of organizing committee of International workshop “Working with Industry” held at NIIT from 19 Feb 2006 to 20 Feb 2006.

- **Head of Academics and Member Management Committee** – NUST Institute of Information Technology (NIIT), Rawalpindi. March 99 – Feb 2005

**Major Responsibilities:** Principal contribution in establishing the institute, ranging from renting a suitable accommodation, furnishing the classrooms/Labs to designing of state of the art courses/curriculum for both Postgraduate and Undergraduate Degree Programmes in IT as well as for specialized short courses in IT and selection/hiring of suitable faculty/staff members to the smooth conduct of various UG/PG level examinations and projects.

Planned and managed the following activities:

IT Education

Faculty Development Workshop on Web Technologies in Collaboration with Punjab IT Board conducted planned for July 2000

Launching of BIT programme in March 2000

Launching of MIT programme in March 2001

Launching of PhD programme in April 2001

Launching of MCSE programme in Oct 99

Launching of PG Diploma in IT programme in Sept 99

Launching of Diploma in IT, Diploma in NE, and shot courses April 99

Conducted series of professional seminars. Notable among them included : E-Commerce, CISCO Routers, Windows 2000, XML technology etc.

IT Projects

Networking Projects

Establishment of LAN at NIIT (350 Computers) including wireless node- completed

Establishment of LAN at HQ NUST (70 Computers) - completed

Establishment of LAN at IESE (25 Computers) - completed

Web Development Projects

NIIT’s Web page - completed

NUST’s Web page – completed

## ❖ **Research Contributions**

- **Principal Investigator:** NIIT Network Research Group. 1999 – To date

- Submitted “HEC Research Grant Application Proforma” as Principal Investigator for Capacity Building by “Development of Optical Communication Technologies for Outreach and Research in Pakistan” (DOCTOR in Pakistan) to test high speed data. Mar 2007
- Prepared PC-1 as Principal Investigator for the Establishment of Research Centre for Nanophotonics Sep 2006
- Assistant Director Research and Development: National University of Sciences and Technology, Rawalpindi - Pakistan. July 1996 – March 1999
- Directed following Industrial R&D Projects as Principal Investigator  
ADPCM system (CTI Islamabad) - 1996-1997  
Power supply for rural exchanges (CTI Islamabad) - 1996-1997  
Command, Control, Communications, Computers and Intelligence system (AWC) - 1997-1998  
WDM system for enhancing Information transfer capacity (PASCOM) 1997-1998
- Prepared PC-1 as Principal Investigator for the Research Centre in Modeling and Simulation 1996/1997  
Key contribution in preparing following PC 1s  
Revised NUST PC 1 1997  
IDB funded R&D Projects 1997
- Research Associate: Optical Fiber Communications laboratory, University of south Florida, Tampa, USA. August 1988 – June 1993.
- Summer Intern: Bell Communications Research, Navesink Research and Engineering Center, Red Bank, New Jersey, USA, June 1992- September 1992.

### ❖ *Engineering Contributions*

- Quality Control Officer in Precision Measurement Equipment Laboratory, Pakistan, January 1986 – December 1987.
- Officer Incharge Calibration & Maintenance in Precision Measurement Equipment Laboratory, Pakistan, January 1985 – December 1987
- Electronics Maintenance Officer: in MPDR90 Radar Unit, May 1984 – October 1984.

### ❖ *Community Contributions*

- Senior Member of the Organizing Committee for arranging Blood Donation camps on as and when required basis.
- Tree Plantation activities at the institutional level on quarterly basis.
- Collection of relief funds at the institutional level, for the earthquake affectees of 8<sup>th</sup> Oct 2005.

### Grants awarded for International Workshops

#### ❖ *Organization*

- National Science Foundation, USA

#### *Grant*

US\$ 64000.00



- Charlotte Research Institute, USA US\$ 20000.00
- Higher Education Commission, Pakistan 1 Million
- Pakistan Telecommunication Corporation Limited 1.7 Million
- National Telecommunication Corporation 0.2 Million

## Students Supervised

### ➤ *PhD*

S#	Name	Research Area
1	Lt Col Maroof	Optical Burst Switching: Challenges and Solutions
2	Madiha Zafar	Multicast-broadcast multimedia services in mobile communication networks
3	Ali Hammad	A new paradigm of Network management for Mobile Adhoc Networks
4	Sarmad Sadiq (Committee Member)	Novel paradigms for building autonomous distributed systems like Multi-agent platforms
5	Umar Mahmud	Context Aware Computing Algorithms

### ➤ *Post Graduate (M.Phil/MS)*

S#	Name	Thesis Title
<b>MIT – 1 (PGD)</b>		
1	Riaz Mahmood	Mitigating denial of service attacks using dynamic ingress filtering mechanism
2	Ramla Ahmed	Wavelength assignment using closest wavelength tuning Algorithm
<b>MIT – 1 (18 Years Program equivalent to M.Phil)</b>		
3	Amjad Mehmood	Dynamic Routing through spontaneous resource reservation
4	Muhammad Aamir Bashir	Comparative analysis of Different Failure Recovery Schemes in MPLS Networks
<b>MIT – 2 (18 Years Program equivalent to M.Phil)</b>		
5	Mohammad Ali Awan	Mitigating the effects of Denial of Service Attacks on E-commerce sites and networks
6	Omer Fayyaz	Monitored responsive flexibility in Packet forwarding for congestion control
<b>MIT – 3 (18 Years Program equivalent to M.Phil)</b>		
7	Shahid Nawaz	Mitigating the Effect of Imprecise Network State Information
8	Jawwad Ahmad	EWLCR: A Novel Routing Algorithm for sparse and full wavelength conversion WDM networks
9	Madiha Zafar	TCP SYN Flood Sensor for Internet Backbone
<b>MIT – 4 (18 Years Program equivalent to M.Phil)</b>		

- 10 Riaz Ahmed Sheikh Comparative analysis and design Philosophy of Next Generation unified Enterprise application security
- MSIT-5**  
**(18 Years Program equivalent to M.Phil)**
- 11 Muhammad Umer Wasim Survivable Passive Optical Network (SPAN)
- 12 Usman Younis RSB: MAC Algorithm for Hybrid WD-TDM EPON Access Network

**S# Name Thesis Title**

- 13 Raheeb Muzaffar Priority Swapping Intra-ONU Bandwith Allication Algorithm
- 14 Syed Waqar Hussain Latency and Energy Efficient - MAC (LEEMAC) Protocol for Wireless Sensor Networks
- 15 Maryium Khalid Multani Dynamic Bandwidth Allocation Algorithms for Hybrid EPONs: A Review

**MSIT – 6**  
**(18 Years Program equivalent to M.Phil)**

- 16 Raqeema Akthar Dynamic Bandwidth Management for hybrid TDM/WDM EPONs
- 17 Ammar Rafiq Time Quantum based Online scheduler in WDM EPON
- 18 Haider Raza A Full- Duplex WDM Compatible RoF System Architecture
- 19 Faaiz Hussain Performance Analysis of OBS for PERN Network
- 20 Fawad Khan  
(*MCS Student*) EPON System with Triple Play Support

**MS (EE) – 2**  
**(18 Years Program equivalent to M.Phil)**

- 21 Muhammad Mahroof Performance Optimization of EDA Based Bi-directional Networks using WDM Technology
- 22 Muhammad Ayub Design and Development of na ADPCM Interface Module
- 23 Maj Muhamad Arif Design and Performance analysis of Mobile optical fiber based field communication system for C I Applications

**MS (EE) – 3**  
**(18 Years Program equivalent to M.Phil)**

- 24 Said Khalfan Design and Simulation of Advanced Multimedia EDM-Based Photonic Networks
- 25 Ali Hammad Akbar Fiber Fabry - Perot e'talon: The Marvel Unveiled

**MCS**

- 26 Khudija Begum/  
Nuzhat Fatima Study of various kinds of ICMP Attacks & Design of Sensor for Smurf Attacks at Internet

27	Saira Naz/ Monaza Talha	Exotic Drive Online Storage of Files URLs nad Web Pages
28	Saima Ghafoor	A Study of IPSEC Enabled Transition to IPV6
29	Riffat Zahra/ Shumaila Shahzad	Parallel Resource Computer

**S# Name Thesis Title**

**PGD (IT) - 1**

30	Muhammad Ali Saeed	Distance Learning Through Video Conferencing and Chat
31	Faisal Bilal	Online Family Planning Guide
32	Ramla Ahmed	Web Oriented Content Development
33	Taimoor Ali Khattak	Distance Learning System

**PGD (IT) - 2**

34	Zahid Hussain	Web Based Databases for NIIT Program Coordination Branch
35	Sana Nafees	Digital Library NIIT

➤ ***Under Graduate***

**S# Name Project Title**

**BIT-1**

1	Nazia Afzal	PKI based Security system
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**BIT-2**

2	Qasim Tariq	Computer Based Testing system
3	Faheem Qureshi	Electronic Learning Module with test case of Data Communication
4	Adeel Ahmed Hashmi	Design/Development of Lab Excercises for Enterprise Network Technology

**BIT-3**

5	Mehreen Tariq	Statistical Anomaly Detection for mitigatingTCP Syn flood Attacks through internet backbone
6	M Usman Farooq	Establishment of VPN between NUST campuses

7 Umer Farid Computer Based Testing System for Job applicants

**BIT-4**

8 Qasim Bilal  
Lone Earliest Deadline First & Best Efforts Scheduling Algorithm (E-BES)

**BICSE-1**

9 Mansoor Gul  
Toor Dynamic Bandwidth Allocation in Ethernet Passive Optic networks

**BICSE-2**

- 10 Waqas Ayub Novel Radio-over-Fiber Architecture integrating Broadband wireless and wired-line services
- 11 Sarfraz R  
Ramay Advance reservation and Dynamic Point to Multipoint Scheduling of Light Paths in Optical grids
- 12 Faraz Arshad Advance reservation and Dynamic Point to Multipoint Scheduling of Light Paths in Optical grids
- 13 Asim Shafique Burst Scheduling in Optical Burst Switching
- 14 Sajjad Ahmad Radio Over Fiber based Network Architecture for Downlink

**BICSE-3**

15 Haris Junaid Automation of Lycoming Engine Test Bed

**BEE-2**

- 16 Talha Imran  
Usman Afzal To Implement QoS in BBS (OBS)
- 17 Aqeel Ahmed Hybrid Wireless Optical Broadband Access Network (WOBAN)
- 18 Usman Mufti Enhancement of Existing Dynamic Bandwidth Allocation Algorithm (NLPDBA) in TDM Passive Optical Network
- 19 Ali Munir Dynamic Optical Circuit Switching (DOCS)

**BEE-3**

20 Abis Zaheer Hybrid Wireless Optical Broadband Access Networks (WOBAN)  
Efficient Routing to Increase Bandwidth Efficiency

## Selected Research Projects

- ❖ Devised a novel architecture for NH-PON (NUST Hybrid PON): Dual Ring Hybrid WDM/TDM Passive Optical Access Network with enhanced QoS support. This high tech research and development project will enable designing and implementation of a high speed access network at NUST new Technology Smart Campus at H-12, Islamabad. The project is geared to help develop an advanced networking infrastructure for Pakistani Scientists, engineers, and health care professionals to communicate and collaborate with international partners.
- ❖ Designed and implemented a software model for fully characterizing the gain and noise characteristics of an Erbium-Doped Fiber Amplifier (EDFA).
- ❖ Demonstrated through Computer Simulation a wavelength-routed unidirectional inter-office ring network employing fourteen wavelength multiplexed systems with 2-nm spacing. This permits a network containing fifteen central offices with proper assignment of signal wavelengths.
- ❖ Devised a self-consistent solution for an interoffice ring network consisting of a cascade of 11 EDFAs that closes on itself and amplifies 15 wavelength-multiplexed signals. The accumulated signal-to-noise ratio is sufficient for 10 Gb/s operation at each wavelength, allowing a network capacity of 550 Gb/s for a full mesh traffic pattern.
- ❖ Sensitivity Enhancement of Coherent Optical Fiber Communication System, Using Analog Frequency Modulation of Optical Carrier by Digitally Modulated Subcarriers: Demonstrated a novel subcarrier modulated coherent optical fiber communication system capable of 11.1 photons/bit reception. A major application of this research would be extension of inter-repeater distance for long-haul fiber-optic communication.
- ❖ Optoelectronic Interconnect System for Next Generation Supercomputers (Funded by DARPA): Constructed a “hybrid” breadboard circuit to demonstrate functioning of overall interconnect system.
- ❖ Design of Pakistan Academic Intranet
- ❖ Routing and Wavelength Assignment algorithms in IP over DWDM Networks
- ❖ Wavelength Assignment Using Closest Wavelength Tuning
- ❖ Dynamic Routing through Spontaneous Resource Reservation
- ❖ Mitigating Denial-of-Service Attacks using Dynamic Ingress Filtering Mechanism
- ❖ Mitigating effects of Denial of Service (DoS) Attacks on E-Commerce Sites and Networks
- ❖ TCP SYN Flood Sensor for Internet Backbone
- ❖ Design and Development of High Speed Network at NIIT
- ❖ Center for Optoelectronics and Optical Communications Research at NUST (CORN)
- ❖ Minimizing the Effect of imprecise network state information through reduced Overhead in the WDM Networks
- ❖ EWLCR: A Novel Routing Algorithm for Sparse and Full Wavelength Conversion WDM Networks
- ❖ Comparative Analysis of Different Failure Recovery Schemas in MPLS Networks
- ❖ Monitored Responsive Flexibility in Packet Forwarding for Congestion Control
- ❖ Measurement and Analysis for the Global Grid and Internet End-to-end Performance” (MAGGIE)
- ❖ Selection, Training and Assessment of Future Faculty (STAFF)
- ❖ Capacity-Building in Pakistan by Research and Development of Test beds for Global Lambda Integrated Facility (GLIF) Nodes, under Pak-US Science and Technology Cooperative Program (USAID)
- ❖ Enterprise Network Security project
- ❖ Development of a Secure Web-based Information and Decision Support System for the PAF Directorate of Engineering

## **References**

1. Professor Dr. Mirsad Hadzikadic  
Dean, College of Information Technology  
University of North Carolina at Charlotte USA
2. Professor Dr Gerard Lachs  
Electrical Engg Dept  
University of South Florida, Tampa Florida USA
3. Dr Ali Elrefaie  
Hewlett Packard Research Laboratories  
Palo Alto California 94304 USA