

**Dr. M Abdul Awal, Ph.D(NY), MPhil/MS(NY), BSEE(NY), Vor-Diplom(Germany), MBA-mini(NJ)**

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## **Education:**

- **PhD (Physics)** – Feb-1984, City University of New York, New York, USA  
Thesis: Laser light scattering and spectroscopic studies of solid state phase transition
- **BSc (Elec-Eng)** – June-1983, School of Engineering, City College of New York (Telecom)
- **MSc. and M.Phil (Physics)** – 1981-83, CCNY; Applied and high energy physics
- **Vor-Diplom (Physics and Math)**- 1977, Univ of Halle, Germany, mathematical physics
- **Abitur (A-level equivalent)** – 1973, University of Leipzig, Germany (Science)
- **HSC** – 1972, Rajshahi Cadet College ( 1<sup>st</sup> position)
- **SSC** – 1970 , Munshiganj High School ( 8<sup>th</sup> position)
- **Mini-MBA** – 1995, Bell-Labs Learning and Performance Center, NJ
- **Citizenship: U.S.A.**

## **Training, Diplomas, and Courses at AT&T Bell-Labs and Lucent Technologies:**

- Digital Wireless PCS/Cellular technology, Emerging wireless markets, 1996
- Business case development, Financial and Technology risk analysis, 1997
- Decision Making Analysis using computer and soft ware tools, 1995
- Internet technology 1996
- Modern data communications and TCP/IP networking, 1997
- Project management workshop, 1994;
- AT&T's Telecom Services, Network Operation and Management, 1988
- Telecommunications network fundamentals, 1988
- Lasers in Medicine and Surgery, SPIE, 1986 Los Angeles
- Computer networking, 1987;
- Visual Basic 1997
- Semiconductor VLSI technology, 1989;
- Unix operating system 1987
- Cultural Diversity Management, 1994;
- Problem solving and Time Management 1987
- Emerging Wireless Technologies, 1999
- Wireless Internet Access, 2000
- UMTS Business Modeling, 2000
- AT&T Network Fundamentals, Switching and Transmission network, 1986
- Working with difficult people, 1990
- Marketing and Business Development, 2001
- Internet Content Generation, Delivery, and Distribution, 2001
- Wireless Local Loop Technology, 1998

## **Courses taken:**

- Electro-magnetic, Solid state, high energy, statistics, spectroscopy,
- Telecommunication Engineering, Mechanics, Thermodynamics
- Mathematical physics, Advanced Algebra, linear and non-linear Diff-Equation
- Computer system, Programming, Digital Electronics, Micro processor
- Financial MBA, focused to Business Case Development

## Teaching and Research Experience:

### Aug. 2001 – Present: North South University

- **Department of Computer Science & Engineering, Telecommunications Engineering Progm:**
  - Courses taught: Digital Electronics, Management of Information Technology, Advanced topics on Management of Information Technology
  - **New Curriculum Development:** Played proactive and leadership role in timely development of market driven curriculum at the time of declining enrollment in CSE programs, such as: **BS in Electronics and Telecommunications Engineering** (enrollment increased by 200-300% within 1.5 years). For same reason an alternate graduate curriculum “ MS in Electronics and Telecommunications Engineering” has also been developed with UGC approval.
- **MS-ETE Program, North South University**
  - Courses taught: Telecommunications Business and Management
- **Center of Inf Communic Technology, North South University**
  - Certificate course on Mobile Technology, Business, Operations and Management
- **MBA Program, School of Business, North South University:**
  - Courses taught: Computer Information System, Management of Innovation and Technology
- **MBA Program, Dept of Banking, University of Dhaka**
  - Courses taught: IT in Financial Services and Banking
- **Enhancement of University-Industry-Government Collaboration:**
  - With Alcatel, development of prototype research concepts in useful mobile data services for their operator customers
  - On-line telephone billing system developed with BTTB
  - NSU's role in the design of machine readable passport (with Immigration and Passport Department), design of Police and RAB Network and services (with BP and RAB)
  - NSU and BASIS for developing outsourcing services from BD
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- **Research Activities and Supervision of BS and MS Thesis, PROJECTS and RESEARCH CONCEPT PROTOTYPES: *Work done by the final year BS and MS students at the Department of Computer Science and Engineering, North South University via partnering with Government and Industries, under supervision of Dr. M. Abdul Awal are listed below:***
- National ID applications development for various segments and developing a prototype: citizenship verification process, fair voting, tax payment, passport issue, loan disbursement process, criminal management
- Applications development and design activities for the Computerized Land Management System (CLMS) for land sales, purchase, revenue collection, classification, ownership verification etc (to work with Ministry of Land)
- Design and implementation of a National Information Center (NIC) for Bangladesh (to work with appropriate Government authorities)
- Design of the Bangladesh Public Service Commission, to recruit, assess, evaluate, and posting for the most suitable civil servants in the BCS exam, by reducing significant lead time ( 3 years to 6 months), through appropriate application of ICT (With team of WB, UNDP and Government)
- Design of performance appraisal system and personnel management of the ministry of establishment, to improve employee productivity via ICT (With team of WB, UNDP and Government)
- Optimum operational model for External Resource Division, for utilization of external credits and grants, through E-Governance (With team of WB, UNDP and Government)

- Development of IT based Political Candidate Assessment Tool (CAT). This user friendly tool may be used by the party leadership or the voters to nominate/vote for the most appropriate candidate (MPs, Commissioners, UP Chairman/members)
- Computerization of Police, design of a distributed network integrating all the functions of the police, courts and other law enforcing authorities (to work with Police, RAB, SB, CID, Thanas, Magistrates, Courts)
- Medical Information System and effective Health Care Management through Information Technology
- Design and development of an optimum supply chain management system and network for strategic industries in Bangladesh
- Accelerating dispute resolutions in the judiciary through developing an information based system and simplified legal framework
- Business and operational model for the upcoming telecom enterprises: Submarine Cable, BTTB transformed into a company, National Networked Interconnection Services Company, Small PSTN operators, Spectrum Management and Revenue models (work with BD Telecom Regulatory Commissions)
- Design and develop information driven decision support models for government and private enterprises (work directly with real persons).
- E-Government: Automation and on-lining the office work, decision making, web based government services and public interfaces, integrated networked process (work with ICT Task Force)
- Work with the Tax (individual and companies), Customs, VAT Administration, Tax Policy modifications for e-filing, developing assessment and monitoring tools for tax payers (work with NBR)
- Design and prototype development of community information center in the post offices of Bangladesh for mass proliferation of ICT (work with BPO)
- Design of integrated network for effective coordination of national security information sharing among the national security and intelligence organizations
- Organizational functional model for fast response with simplified work protocol and online graft case processing in the Anti-Corruption Commission
- Bio-Informatics, Human Genom Project, IT driven models, DNA based ID Dev
- Benchmarking and competitive analysis of Bangladesh with other successful countries and make it a competitive choice for outsourcing of soft ware and IT enables services by the western customers
- Improving competitiveness of the Bangladesh Garments and textile sectors in post MFA era by successful deployment of IT in the marketing, production and supply chain management (work with industry partners)
- Design and development of prototype procurement tool for corruption free and transparent tendering, evaluating, and purchasing (work with Govt Agency)
- Develop IT tool for effective management of Annual Development Budget and execution of projects (work with Ministry of Planning)
- Design, planning and operational model for the Deep Sea Port in BD
- Hospital Automation and Patient Administration using IT applications
- Developing subscriber access loop network for effective utilization of Submarine cable network (work with PSTN and mobile operators)
- National fiber optic backbone design using the power grids of BD (work with Power Grid Company Ltd)

- Modeling the India's River linking project with minimum adverse effect on BD (work with Govt's agencies and water modeling groups)
- IT in the local government and rural development of BD (NGO and LGRD)
- Telecom Policy Modifications and Development on VoIP, VSAT, Submarine Cable, Operator Licensing, Revenue Structure, BTTB restructure, Foreign Investment management (work with the Telecom Ministry and BTRC)
- Decision support tool development for: voting the right electorate candidate, ranking the universities and colleges, the Govt Agencies, public service utility companies etc
- Feasibility study for automobile and electronic manufacturing in Bangladesh (segment to choose with BD Malaysia CC)
- Transferring the best practice from other: application of Multimedia corridor model in the IT Technology Park in Kaliakoir (work with Ministry ICT and Malaysia)
- Design and develop national satellite tracking system (work with law enforcement)

#### **Aug. 2001 – Present: Others**

- **IT Advisor**, University of Dhaka, Institute of Information Technology, Dhaka: IT curriculum development, MSc thesis supervision ( Caching technologies, IT in Banking)
- **Guest Lecturer:**
  - Military Institute of Science and Technology: Scope and opportunities in ICT
  - BPATC, Savar: E-Governance and Decision Support System using ICT tools
  - Islamic University of Technology: Intra-OIC collaboration in Trade and Technology
  - Royal Roads University: Digital Technology Management: Process and Strategies
  - Diploma Engineers Institute: Scope and opportunities in ICT in its Curriculum

#### **Sep. 1977 - 2001**

- University of Bradford, Dept of Electronics Engineering, West Yorks, England, 1990-91  
Courses taught: Opto-electronics, communications, Device Fabrication, and undergraduate courses in fiber optic communication system, optical networking, Health Physics
- Polytechnique University of Brooklyn, Dept of Electrical and Computer Engineering, 1982-84  
Courses taught: Computer Syst Architecture, Digital Electronics, Fiber optics communic
- Bronx Community College, CUNY: 1982 Dept. of Physics, Engineering and Health physics
- Manhattan College, 1981, Dept of Physics ( Health and Engineering physics for undergraduates)
- College of Staten Island, 1980-82: Dept of Applied Physics and Electronics, all under graduate courses in digital systems, statistics, dynamics, beginners and advanced physics, electronics
- City College of CUNY, 1978-83: Dept of mathematics and physics ( Engineering physics, health physics, Astronomy, Calculus, Algebra, Applied mathematics, remedial math for math-weak students)

#### **Industry Work Experience:**

##### **Aug. 2001 – Present:**

- **Consultant**, Submarine Cable Network, Bangladesh Telephone and Telegraph Board, Dhaka
  - i. System requirement design, procurement, implementation of high band-width submarine cable network, and integrate/interface with upgraded transmission and switching netwk
  - ii. Design and implementation of Game Game Phone and Internet Project

- iii. Enhancement of national voice and data backbone network of Bangladesh
  - iv. Re-structure and business optimization modeling for Bangladesh T&T, revenue enhancement, new service introduction, design the mobile network, and technology assessment for return of investment.
  - v. Development of BTTB's Mobile Operational Model as an independent entity while 100% owned by the government, named "Teletalk"
  - vi. Submarine Cable Business Model Development which is expected to replace VSAT for all current VSAT users, with competitive price and broadband services. Service inaugurated May 21, 2006 in Cox Bazar.
- o **Analyst**, Telecom and IT Infrastructure and Services Development with Bangladesh Telecom Regulatory Commission:
    - I. With IIFC team, worked on the draft of Telecom policy formulation based on 1998 framework
    - II. Spectrum management model, leading to BRTC's decision to auction spectrum instead of leasing, bring more revenue for government
    - III. Development of multiple Inter-Connection Models for all PSTN and Mobile Operators that will reduce cost for consumers and improve interconnection among subscribers
    - IV. Mobile Charge per minute cost model development
    - V. Design and Develop profitable PSTN operation and business model
    - VI. Economic Modeling and Traffic analysis for multiple telecom and IT growth strategic options in Bangladesh to year 2010
    - VII. Impact of higher tele-density upon national economic growth
    - VIII. Internet opportunities and challenges in Bangladesh
    - IX. National Telecom and IT Master Plan, and the road map for the role of Government and private investors in the sector development
    - X. Development of cost based pricing model for Telecom Services and transport medium and Operator Business Model for Telecom and ISP operators

### Administrative Experience: Bangladesh

- **2001 – present:** Administer the complete procurement process of the Submarine cable network for Bangladesh, including the development of new operational business model that enables IT growth and expansion. Assist in Mobile Technology choice and business development, adoption of advanced voice and information technology by BTTB
  - **2001 – present:** University-Industry cooperative R&D work in the IT: NSU students to work in Siemens advanced IT lab, technology collaboration with Nortel, IT enabled services and Human Resource development program with the USAID and CIDA, and JICA. Working relationship between BTTB and NSU
  - **2001 – present:** Helping the Bangladesh Export Processing Zone Authority and Board of Investment, to develop a long term strategic plan to attract foreign direct investment in IT, electronics and other domestic sectors
- o **Advisory and Consulting Activities: Bangladesh**
    - I. **Government of Bangladesh: 2001 – present:**
      - Prototype development of national ID and Machine Readable Passport
      - Help design the Nationwide Police Network and services
      - Development of management information system for RAB
      - Process development for Evaluating and Ranking ICT training institutes, with BCC
      - Help Bangladesh Bank become equity partner in entrepreneurial ICT initiatives through in-depth analysis of Business Proposals
      - ICT policy and IT sector development with MOSICT
      - Telecom Regulatory commission: organization, tariff, spectrum, transitory roles
      - Telecom Sector: mobile communication, fiber optic access network, broadband services

- E-Governance: IT-ize government sectors to improve efficiency and transparency
- Computer literacy program and curriculum development from elementary school to colleges of Bangladesh, and teacher's training program
- Simplification of tax collection system for Bangladesh with use of IT, and tax reform initiatives
- Industry sector development: tourism, leather, banking and financial services, NGOs etc.
- Developing Secure Passport System with GoB
- Helped organize brainstorming sessions in the ministries for improvement of their services, processes, and revenues.
- Helped Ministry of Science and Information Communication Technology with the working papers for WSIS and SAARC, in 2005

## **2. Works with other Public Private Enterprises of Bangladesh:**

- a. **Post Office:** Initiatives to reverse loss making with new services introduction and reengineering its operational model
- b. Prototype demo in **Computerized Land Management System**, developed with the AC (Land)
- c. BGMEA for enhancing supply chain network thru GNX

## **1984 – 2001: AT&T Bell-Labs and Lucent Technologies, New Jersey, USA**

### **1998-2001: Mobile Internet Strategy and Development, Lucent Technologies, Whippany, N.J. *Operator Business Model for Mobile Internet Services and Applications***

Developed comprehensive pre-sale business planning models and value propositions, to help potential 3G (UMTS, 3G1X) operators understand the revenue impact of delivering mobile internet contents through their future wireless network and other value partners. The model provides a framework to examine how all the partners involved ( Network Equipment Vendors, Application Service Providers, System Integrators, Content Providers, Content Distribution Network Service Providers, Application Developers, ISPs, Mobile Virtual Network Operators, Data Centers, Cyber Carriers, Network Access Providers and Mobile Network Operators) would make money with 3G.

- Coordinated Customer Team, Product Management, Systems Engineering and Architecture needs Dimensioned Mobile IP access and core network, application servers and data center
- Dimensioned multiple air-interface technologies
- Modeled Services, pricing models and revenue potential

### ***Specific uses of the Business Model:***

1. UMTS Model for European Operator's bid, analyzed multiple business scenarios with virtual and partner network operators to assess the Operator's profitability, since the European Operators paid Billions for the 3G license ( \$10B for 10 MHz)
2. German Mobile Network Operator Model for multiple deployment options of UMTS and Mobile Internet Services enabling the operator to become a Mobile ISP.
3. Greenfield UMTS Operator Model for Spanish Mobile Operator , estimating required market size, revenues, and mobile application sets to become profitable into a new market
4. 3G-CDMA business case for Lucent's Mobile Internet Product Releases, helping LT's Mobile Operator Customers analyze 3G Data Network and Applications deployment strategy, as an incremental investment to its existing mobile voice network

- **Regulatory Agency Experience: Sep-1999 to Jan-2001**

- Worked with European Telecom Regulatory Agency, in modeling the spectrum auctioning for the EU operators to deploy 3G technologies
- Worked with FCC, in developing 3G standards (WCDMA vs UMTS) for enhanced voice and data services

## 5. Work in Progress:

- Business Model for several major North American Operators, – to position Mobile Internet Network Equipment Vendors ( Access, Core, CDN, Mobile Internet Platform) in providing complete end-end Mobile Internet Solutions
- Business Model for Brazilian and Argentinian 3G Operators – analyze the business of running as a wireless data Service Bureau for multiple operators deploying Mobile Internet in the 3G network, CDMA, TDMA, GPRS, UMTS, and help optimal 3G deployment strategy from the existing 2G network

### ***Developing New Mobile Market Opportunity:***

1. Potential value chain analysis via introducing mobility in the Transport Industry, Food Industry, Games, Financial, Insurance, Sales Markets ( with Kraft, Hospitals, HMO, Drug Cos, Mobile Network Operators, RF Device Manufacturers)
2. Value proposition for wireless content distribution business for mobile and portable users requiring high bandwidth, providing the complete Mobile Internet Business Solution as one stop shop for the 3G Mobile Network Operators, with the CDN Vendors, SPs and other internal and external partners.

### **1996-1999: Wireless Data Networking Laboratory, Bell-Labs, Lucent Technologies, Whippany** *Wireless Network System Architecture Analysis, Economic Modeling of Technologies*

1. Developed 3G Packet Data Business Case, including Packet Data Network configuration and 5 year equipment forecast (BTS-SW, PHVs, IWFs, etc.) in support of LT's AMPS/PCS Product Management
2. Contributed to HDR Technology evaluation using a NA Operator Wireless Packet Data Model, supporting Lucent's evaluation of HDR as a portfolio asset, done with Bell Labs Advanced Technology Group and the product team
3. Performed spectrum analysis for Edge Data for a North American Market, for engineering sales support, to estimate required spectrum, and impact on existing voice spectrum.
4. Analyzed for the Executives, the viability of a NA wireless operator as an Internet Access Provider, understanding the impact of technology transitions from circuit to packet data and 2G to 3G CDMA and GSM air interfaces. Analysis revealed vast difference in network investment cost/sub and NPVs between circuit and packet technologies.
5. Modeled revenue and profitability of various Lucent business models as a supplier in the Mobile Internet space, including Lucent as a network provider as well as Lucent as a wireless data service bureau for multiple operators (done with help from Octel)
6. Major Japanese Mobile Network Operator and WISP modeling with multiple W-CDMA deployment options, done with the System Engineering and Japanese marketing team. Identified packet data services which would make the 3G deployment profitable (migrated from the PDC)
7. Global provisioning and manufacturing cost model for wireless internet access products: With a full-stream cost model developed by Author with other Bell-Labs teams, analyzed multiple provisioning options for the product, optimizing profitability for the entire supply chain ( design centers, manufacturing locations, components suppliers, shipping of circuit packs, system integration, transfer pricing, duty/tariff, transport, local taxes, transfer prices, global customers locations, pricing)
8. Compare the economics of RF access technologies, CDMA, TDMA, GSM, W-CDMA via modeling of mobile voice, circuit, and packet data network of NA operators, and what-if analysis of scenarios for cost per minute of each service and transport ( voice, location service, email, local and long distance telephone, international long distance, video service, data transfer, peak-hour, off-peak hour cost).
9. Complete business case development for a telephone operator, so it can have different pricing options for various service configuration, for both wire-line and wireless technologies, development of profit based vs. capped margin based model

**1991-1995: AT&T Bell Laboratories, Engineering Research Center, Princeton, New Jersey**  
Senior Scientist, *Manufacturing System Engineering, Optimizing Global Supply Chain*

1. Developed the **Global Wireless Manufacturing Capacity Planning Tool** for the Network Wireless System in Columbus manufacturing planning team, to help make appropriate global manufacturing capacity ( floor space, headcount, and capital equipment) investment and distribution decision which optimizes the COGS and profitability. Worked with all the AT&T's global wireless factories in Europe and Asia, Bell Labs R&D, Manufacturing Process Engineering, Product Management so Lucent may plan to fulfill future product demands taking advantage of the product technology improvement, existing factory resources, inventory planning, and the existing supply chain network. The Chief Wireless Manufacturing Officer used the results to restructure AT&T's existing global wireless factories and purchase new factories.
2. Developed **Full-Stream Cost-Profit Model** for the AT&T Supply Chain Network. The tool optimized the network system sales profit of AT&T and its subsidiaries in multiple global locations, by taking into consideration the cost of country-tax, transport, tariff-duty, labor, inventory, components, local bureaucracy, VATs, and delivery time. Tool was used to estimate the optimum landed COGS and net profit for the sale of 5E products supplied from all of AT&T's global locations (Taiwan, Holland, China, India, and OKC) to the 5E customers, also with decisions to help allocate productions.
3. **Factory of the Future:** Built and prototyped the concept of the semiconductor factory of the future, which grow and test high speed electronic and photonic materials ( epitaxy) while growing, via a series of non-destructive techniques ( electrical, physical, optical properties)
4. Translate Bell-Labs **Incubating technologies into marketable products:** Worked as go between the Bell-Labs R&D, and the Customer, Product, and Marketing team to help develop products from the technology inventory of Bell-Labs and/or Universities.

**1985-1991: AT&T Bell Laboratories, Engineering Research Center, Princeton, New Jersey**  
Senior Scientist, *Opto-Electronic Integrated Circuit, Non-Destructive Testing Group*

- III-V ( GaAs, InP) on Si, Ge **epitaxial materials growth** with MBE, and MOCVD, including complete design of the materials growth system.
- Non-Destructive **In-Situ Monitoring Techniques** Development, to control epitaxial layer thickness, alloy composition, opt-electronic properties in an ultra-high vacuum environment
- Fabrication and testing of integrated opto-electronic device: GaAs, GaAlAs, InP detector, LiNbO3 wave guide, III-V of Insulator device, Si-Ge alloy detector.
- **Lattice match engineering:** Successful growth and testing of alloys whose lattice parameters do not match, such as Si and Ge, InP and GaAs.

**Computer skills:**

- **Unix O/S, Visual Basic, Excel, MS Office-2000, Simulation, Decision Support**

**Modeling skills and Tools Development:**

- Mobile and Fixed Circuit Switch Voice Traffic Model for Wireless Access Network
- Packet Data and Circuit Switch Data Traffic Model for Full Mobile Internet Network
- Decision Model: where to manufacture, how to price, which supply-route etc.
- Business Architecture and Engineering Model when introducing new products
- Nuernberg, Germany: Modeling Low Cost Mobile Manufacturing Process and Factory



## Publications of M. Abdul Awal:

1. "A Critical Investigation of the Determination of Activation Enthalpie for Thermally Stimulated Process", M.Abdul Awal, G Berg and U. Gromann (colleagues from University of halle, Germany), in *Experimentelle Technik der Physik*, **28(1)**, pp 53-61 (1980)
2. " Brillouin Raman Scattering Studies of Melting Transition in Salol", M.Abdul Awal H.Z. Cummins (PhD supervisor at the City University of NY), *J. Phys. Chem. Solids*, **46 (9)**, pp 1037-1051 (1985)
3. "Raman Microprobe Study of Si and Ge on Insulator", M.Abdul Awal, I.H. Campbell, P.M. Fauchet ( Colleagues from the Princeton University, N.J.) and El-Hang Lee ( Bell Labs' Colleague) , *Thin Solid Films*, **154**, pp 249 (1987)
4. "Method for Heteroepitaxial Growth using Multiple MBE Chambers", International **Patent No. 4, 786, 616**, invented by Awal and Lee, Dated Nov-22, 1988, Applic. No. 61,069, Assignee: AT&T, New York, USA
5. " An Auger investigation of the effects of rapid thermal annealing of GaAs on Si with or without intermediate Ge layers", M.Abdul Awal, R.L. Opila, E-H Lee, and R.M. Lum, (Colleagues from AT&T Bell Laboratories, Murray Hill, N.J.), *J. Vac Sci. Technol.* **A 7 (3)**, pp 1558 – 1562, May/June 1989
6. " Structural Properties of Heteroepitaxial Semiconductor Islands by Raman Microscopy", M.Abdul Awal, P.M. Fauchet, I.H. Campbell, (Colleagues from the Princeton University, N.J) and E-H Lee (Bell Labs), International Conference on Raman and Luminescence Spectroscopy in Technology, J.E. Griffiths and F. Adar, editors, *SPIE Proc.* **822**, pp 25-30, (1987)
7. " Hetero-epitaxy of GaAs on Si with Intermediate layers of Evaporated Ge and Recrystallized Ge-on-Insulator (GoI)", M.Abdul Awal, E-H Lee, E. Y. Chan, (Colleagues from AT&T Bell Laboratories, Princetonl, N.J.), Ext Abstracts of the 18<sup>th</sup> Conf. on Solid State Device and Materials, Tokyo, **pp 121 – 124**, Aug-1986
8. "Electronic and Optoelectronic Characterization of Au Schottky Barrier Contacts on MOCVD Grown (1) GaAs/Ge, (2) GaAs/Ge/Si, (3) GaAs/Si", M.Abdul Awal, E.Y. Chan, E-H Lee, R.M. Lum, J.K. Klingert (Colleagues from AT&T Bell Laboratories, Princetonl, and Holmdel, N.J.), Proc. Of the IEEE Int. Electron Dev. Mtg, Los Angeles, **IEDM-86, pp 96-99**, Dec 7-10. 1986 IEEE
9. "Material Characterization of GaAs/Ge/Si by Evaporation and MOCVD", M.Abdul Awal, E-H Lee, EY Chan, G.L. Koos, G.K. Celler and T.T. Sheng, Mater Res Soc Symp Proc, Palo Alto, April 15-17, 1986, Heteroepitaxy on Si, **Vol. 67**, pp 93 (1986), edited by J.C. Fan and J.M. Poate
10. "Effect of RTA on Structural and Optoelectronic Properties of Epitaxial GaAs/Si grown with or without Ge layer", M.Abdul Awal, E-H Lee, R.L. Opila, D.C. Jacobson, S. Pearton,( Colleagues from AT&T Bell Laboratories, Princetonl, and Holmdel, N.J) Mater Res Soc Symp Proc, **Vol. 92**, pp 347 (1987)
11. "Growth of epitaxial Ge and GaAs film on Si by Vacuum Evaporation and MOCVD Techniques", M.Abdul Awal, E-H Lee, G.K. Celler, and T.T. Sheng,( Colleagues from AT&T Bell Laboratories, Princetonl, and Murray Hill, N.J) Proc of Metallurgical Soc of AIME, New Jersey, May 1-2, 1986, in 'Semiconductor Based Heterostructures: Interfacial Structure and Stability' edited by M.L. Green et al, **pp 275 (1986)**
12. "Compound Semiconductors on Si: Monolithic Integration of Photonics and Electronics in the Future", M.Abdul Awal, E-H Lee, Proc of AT&T Conf on Interconnections and Communication Issues of the Future, held at Bell Labs-Holmdel, N.J., **May 8-9, 1986, pp 35-38**, edited by S.K. Tewksbury
13. "Zone-Melt Recrystallization of Ge on oxide coated or nitride coated Si), M.Abdul Awal, E-H Lee, G.K. Celler, L.Pfeiffer, K. West and T.T. Sheng, (Colleagues from AT&T Bell Laboratories, Princetonl, and Murray Hill, N.J), 1986; Proc Metallurgical Soc of AIME, **pp 319**, in 'Semiconductor Based Heterostructures', edited by M.L. Green et al, (1986)
14. "Growth and Characterization of GaAs on Si with Ge Intermediate layer", M.Abdul Awal, E-H Lee, Mater Res Soc Symp Proc, Fall Meeting, Amherst, **Vol. 92**, 1987
15. "An Overview on: Opto-electronic Integrated Circuits on Si Technology", invited talk by M.A. Awal, Proc Int Conf Recent Advances in Physics, by the Bangladesh Physical Society, September 10, 1990, Dhaka, Bangladesh
16. "Future Trends of Telecommunications and IT Sector Development in Bangladesh", M.Abdul Awal, M. Enamul Haq and A.F.M.N.H. Chowdhury (Chairman, BTTB), Spec Issue of BCS Technical Journal on World Telecom Day, May 17, 2003, held Dhaka, Bangladesh

17. "Infrastructure Development for using Internet for Education", invited paper by M.A. Awal, Proc of the Int Conf on Application of Internet for Education, held in BUET, Aug-2004
18. "III-V on Si Technology M.Abdul Awal lattice matching layer", M.A. Awal and E-H Lee, Bull. Amer Phys Soc, **March 18-21, 1987** Atlanta
19. "Optoelectronic IC fabrication and Testing with GaAs on Ge/Si", M.A. Awal and E-H Lee, Proc of the IEEE David Sarnoff Symp, **April 12-13, 1988** held in Princeton, N.J.
20. "Construction of Disease Diagnostic Sub-System – Special Methods of Converting Continuous Attributes to Discretes", M.Abdul Awal, M. Ashraf Amin, AHFM Saiful Kabir, and Pavel Rana (CSC Students of NSU), Proc Int Conf Comp Inf Tech, **Dec-2002**, Dhaka
21. "Comprehensive Dev and Bus Plan for Telemedical Infrastructure for Bangladesh", M.Abdul Awal M. Ashraf Amin, AHFM Saiful Kabir, and Pavel Rana, (CSC Students of NSU), Proc Int Conf Comp Sc Its Applic (ICCSA-2003), July 1-2, 2003, San Diego, CA, **Paper No. ICCSA03J011**
22. "Design of Caching Network for Cost Effective Internet Contents", M.Abdul Awal, M. Raihan (DU Student's MS Thesis), Proc Int Conf Comp Inf Tech, **Dec-2002**, Dhaka
23. "Scope of IT in Judiciary and Law & Order Enforcement Dept: A step to E-Gov Third World Country Bangladesh", M.Abdul Awal, M. Sarwar Alam, M. Ashraf Amin (NSU Students' BS Thesis), Proc Int Conf Comp Sc Its Applic (ICCSA-2003), June 28-30, 2004, San Diego, CA, **Paper No. ICCSA04101**
24. "Design Dev Inf Cell at Upazella Level for Bangladesh- A step towards E-Gov", M.Abdul Awal, M.G. Kibria, Kazi A. Haque, M. Ashraf Amin (NSU Students' BS Thesis), Proc Int Conf Comp Sc Its Applic (ICCSA-2003), June 28-30, 2004, San Diego, CA, **Paper No. ICCSA04102**
25. "ICT in Judiciary", Proc Int Conf E-Gov, Jan- 2004, Seoul, Korea

**INTERNAL TECHNICAL REPORTS WITHIN THE BELL LABORATORIES AT AT&T AND LUCENT TECHNOLOGIES DURING 1988-2001 WHICH COULD NOT BE PUBLISHED DUE TO THEIR BUSINESS PROPRIETARY NATURE. VAGUELY MENTIONED HERE ONLY SOME REMEMBERED TITLES, SINCE THESE REPORTS WERE NOT ALLOWED TO BE TAKEN OUT OF BELL LABS:**

26.  
 15 publications in US professional journals in areas of (new understanding)  
 Lattice mismatch engineering, III-V/Si, Non-destructive testing, device testing, Mobile Internet, Economic modeling of technology options, supply chain management, Telecom cost management  
 40 presentations and publications in the proceedings of International conference  
 Regular invited talks to national and international institutes

#### **Affiliations :**

- American Physical Society
- IEEE
- Mobile Internet Platform

#### **Associations with Bangladeshi Institutes:**

- BTTB: Through periodic presentations and interactions, keep BTTB, BUET, and other universities, informed of the latest advancement in the telecom industry and Bell Labs, since 1977
- Bangladeshi Mobile and Landline private operators: technology and business advisory activities
- Help formulate telecom policy of Bangladesh, Developed a 15 year Master Planning model for the growth of telecommunication in Bangladesh, Advisory role ( voluntary)
- Assistance to Primary education curriculum development with the UNESCO, 1988
- Assistance to long term flood management program of Bangladesh, since 1988
- Bangladesh Export Processing Zone Authority, competitive benchmarking of Bangladesh with respect to other countries to attract direct foreign investments in non-garments sectors, and with increased local value add, technology transfer, and skilled manpower development
- Bangladesh Computer Samity and Bangladesh Software Society, assisting in the area of strategic planning of business, network, products, and web hosting that is in alignment of the long term plan of the country.
- Universities: assisting in the IT curriculum development to widen university wide Computer and IT literacy ( Jahangirnagar University, Dhaka University, Tangail University)

- Industries: Interacted with the executives while my students did their term paper in the sectors to help improve their economic productivity via implementation of IT, in: Jute, leather, tourism, private banks, government banks, ISPs, Software developers, NGOs, Mobile Operators, land line operators, entertainment, cyber café, IT enabled export services

## References:

Dr. Bruno Bosacchi – Bell Labs, Product Technology, Lucent Technologies, Princeton  
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 Prof/Father Phillips: Manhattan College, NY  
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 Mike Simmons and Mick Strandberg – 3G-CDMA packet Data Netwk Equipment Forecast  
 Jim Harris and John Hall – NA Mobile Oper Customer team and pre-sales engineering support  
 Eng Jorg Janssen, Dr. Hans Friedrich – European Mobile Oper Customer team ,  
 UMTS Network /Business Modeling/ Pre-Sales Support/Sales-Marketing  
 Phil Moody – UK Bids/Proposal team, European 3G Mobile Operator Business Development  
 Ed Hines and Dr. John Friedenfelds – Global Wireless Manufacturing capacity planning tool  
 Greg Ambrose, Rita Lam, Jansette Anz – Wireless Service Provider Customer Business  
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