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Ali Arshad Nasir

Personal Information

Date of Birth: January 15, 1985

Place of Birth: Rawalpindi, Pakistan

Education

06/2009 – 09/2012: **PhD**, *Electrical Engineering (Telecommunications)*, College of Engineering and Computer Science (CECS), The Australian National University (ANU), Australia.
Web: http://users.cecs.anu.edu.au/ alinasir/.

Thesis Title: *Synchronization in Wireless Communication Systems*

Supervisors: Dr. Salman Durrani, Dr. Hani Mehrpouyan, and Prof. Rodney A. Kennedy.

09/2003 – 08/2007: **(4-year Bachelor) in Electrical Engineering**, *Major studies in Electronics and Telecommunications*, (Gold Medalist) GPA: 90.5/100,
Univesrity of Engineering & Technology (UET), Lahore, Pakistan.
Web: http://www.uet.edu.pk.

08/2001 – 04/2003: **F.Sc. in Pre-Engineering**, *Federal Board of Intermediate and Secondary Education F.B.I.S.E, Islamabad*, (Silver Medalist) GPA: 87.0/100,
F.G. Sir Syed College, Mall Rd., Rawalpindi, Pakistan
Web: http://www.fbise.edu.pk.

Professional Experience

09/2012 – Current: **Post Doctoral Research Fellow**, *Applied Signal Processing Group*, Australian National University, Australia.

Supervisors: Dr. Xiangyun (Sean) Zhou, Dr. Salman Durrani and Prof. Rodney A. Kennedy

Work Highlights: I am working on Australian Research Council (ARC) Discovery Project. The project topic is "**Simultaneous Energy Harvesting and Information Processing**".

04/2011 – 10/2011: **Research Intern**, *Signals and Systems Group*, Chalmers University of Technology, Sweden.

Supervisors: Dr. Hani Mehrpouyan, Prof. Tommy Svensson and Prof. Thomas Eriksson

Work Highlights — I worked on the following projects:
Phase noise estimation and compesnation in LoS MIMO systems.
Timing and carrier synchronization with channel estimation in multi-relay cooperative networks.

06/2008 – 06/2009 — **Design Engineer**, *Communication Group*,
Center for Advanced Research in Engineering (CARE), Pakistan.

Managers — Dr. Hammad A. Khan and Dr. Shoab A. Khan

Work Highlights — I worked in the algorithm development and implementation of different physical layer blocks of wireless communication system using Orthogonal Frequency Division Multiplexing (OFDM) system.
I developed and simulated the algorithm for global position identification using LOng RAnge Navigation (LORAN-C) system.
I was involved in the development of the feasibility reports of all on-going projects.

11/2007 – 06/2008 — **Lecturer/Lab Engineer**,
University of Engineering & Technology, Lahore, Pakistan.

Work Highlights — Graduate Lab: EE-440 Digital Signal Processing, 2007
Graduate Lab: EE-122 Semiconductor Devices, 2008
Graduate Theory: EE-102 Applied Electricity, 2008
Graduate Lab: EE-102 Applied Electricity, 2008

Teaching Experience

Semester 1,2013 — **Co-lecturer**, *ANU*,
ENGN-3226 Digital Communication,
Web: http://studyat.anu.edu.au/courses/ENGN3226;details.html.

Semester 2,2012 — **Tutor**, *ANU*,
ENGN-2228 Signal Processing,
Web: http://studyat.anu.edu.au/courses/ENGN2228;details.html.

Semester 1,2012 — **Tutor**, *ANU*,
ENGN-1218 Introduction to Electronics,
Web: http://studyat.anu.edu.au/courses/ENGN1218;details.html.

Semester 1,2012 — **Tutor**, *ANU*,
ENGN-3226 Digital Communication,
Web: http://studyat.anu.edu.au/courses/ENGN3226;details.html.

Semester 1,2012 — **Tutor**, *ANU*,
ENGN-2218 Electronic Systems and Design,
Web: http://studyat.anu.edu.au/courses/ENGN2218;details.html.

Semester 1,2011 — **Tutor**, *ANU*,
ENGN-2218 Electronic Systems and Design,
Web: http://studyat.anu.edu.au/courses/ENGN2218;details.html.

Semester 2,2010 — **Tutor**, *ANU*,
ENGN-2228 Signal Processing,
Web: http://studyat.anu.edu.au/courses/ENGN2228;details.html.

Semester 1,2010	**Tutor**, *ANU*, ENGN-3226 Digital Communication, Web: http://studyat.anu.edu.au/courses/ENGN3226;details.html.
Semester 2,2009	**Tutor**, *ANU*, ENGN-2228 Signal Processing, Web: http://studyat.anu.edu.au/courses/ENGN2228;details.html.
11/2007 – 06/2008	**Lecturer/Lab Engineer**, *(Employer UET Lahore)*, University of Engineering & Technology, Lahore, Pakistan. Web: http://www.uet.edu.pk.
Graduate Lab	EE-440 Digital Signal Processing, 2007
Graduate Lab	EE-122 Semiconductor Devices, 2008
Graduate Theory	EE-102 Applied Electricity, 2008
Graduate Lab	EE-102 Applied Electricity, 2008

Research Interests

- Timing and Carrier Synchronization
- Channel Estimation
- Phase Noise Tracking
- Blind Equalization
- Cooperative Communication
- MIMO and Distributed MISO Systems
- OFDM Systems
- Particle Filter and Kalman Filter
- Simultaneous Wireless Information and Power Transfer

Achievements and Awards

Graduate	July 2011-October 2011 Awarded research scholarship by Chalmers university of Technology.
Graduate	April 2011-July 2011 Awarded ANU Vice Chancellor's HDR Travel Grants 3 and 3A. (4500 AUD)
Graduate	2009-2012 ANU International PhD Scholarship
Graduate	MSc Course "Advanced Communication Theory", *Rank*: 1/14
Undergraduate	*Silver Medalist*– B.Sc. Electrical Engineering, UET Lahore. *Rank*: 2/300
Undergraduate	*Gold Medalist*– Final Year, B.Sc. Electrical Engineering (Electronics & Telecommunication), UET Lahore. *Rank*: 1/300
Undergraduate	Final Semester, B.Sc. Electrical Engineering, UET Lahore. Set up a Record Percentage *GPA*: 97.625/100
Undergraduate	First Position in all 8 semesters in B.Sc. Electrical Eng., UET Lahore *Rank*: 1/74
Undergraduate	Awarded Merit Scholarship in all 8 semesters in B.Sc. Electrical Eng., UET Lahore
Undergraduate	Awarded NESCOM (National Engineering and Scientific Commission) Scholarship in all eight semesters in B.Sc. Electrical Eng., UET Lahore
F.Sc	*Silver Medalist*– F.Sc. Federal Board of Intermediate and Secondary Education (FBISE), Islamabad *Rank*: 2/60,000
F.Sc	2003-2007 Quaid-e-Azam Merit Scholarship from FBISE

Research Grants

- **ANU HDR Travel Grant**: Awarded with the ANU HDR Travel Grant that funded my research visit to Chalmers University of Technology, Sweden.
- **ARC-Grant**: Involved in writing Australian Research Council (ARC) grant with Dr. Salman Durrani and Prof. Steven Blostein on *Robust synchronization techniques for future wireless networks*
- **John Stocker-Grant**: Submitted John Stocker Postdoctoral fellowship with Dr. Xiangyun Zhou and Prof. Rodney A. Kennedy on *Wireless Energy Harvesting and Information Processing in Energy Constrained Communication Networks.*
- **ABB-Grant**: Submitted ABB grant proposal with Dr. Xiangyun Zhou and Prof. Rodney A. Kennedy on *Throughput and Energy Efficient Protocols for RF Energy Harvesting in Wireless Sensor Networks.*

Journal Publications

Phase Noise

[J10] O. H. Salim, **A. A. Nasir**, H. Mehrpouyan, W. Xiang, S. Durrani and R. A. Kennedy, "Channel, Phase Noise, and Frequency Offset in OFDM Systems: Joint Estimation, Data Detection, and Hybrid Cramer-Rao Lower Bound," to appear in *IEEE Transactions on Communications*, 2014.

Phase Noise

[J9] A. O Isikman, H. Mehrpouyan, **A. A. Nasir**, A. G. Amat, and R. A. Kennedy, "Joint phase noise estimation and data detection in coded multi-input–multi-output systems," *IET Communications*, vol. 8, no. 7, pp. 981-989, May. 2014.

Wireless Energy Transfer

[J8] **A. A. Nasir**, X. Zhou, S. Durrani, and R. A. Kennedy, "Relaying Protocols for Wireless Energy Harvesting and Information Processing," *IEEE Transactions on Wireless Communications*, vol. 12, no. 7, pp. 3622–3636, Jul. 2013.

MIMO Phase Noise

[J7] **A. A. Nasir**, H. Mehrpouyan, R. Schober, and Y. Hua, "Phase Noise in MIMO Systems: Bayesian Cramér-Rao Bounds and Soft-Input Estimation", *IEEE Transactions on Signal Processing*, vol. 61, no. 10, pp. 2675-2692, May 2013.

Cooperative Communications

[J6] **A. A. Nasir**, H. Mehrpouyan, S. Durrani, S. Blostein, R. A. Kennedy and B. Ottersten, "Transceiver Design for Distributed STBC Based AF Cooperative Networks in the Presence of Timing and Frequency Offsets," *IEEE Transactions on Signal Processing*, vol. 61, no. 12, pp. 3143-3158, June 2013.

Training Sequence Design

[J5] **A. A. Nasir**, H. Mehrpouyan, S. Durrani, S. Blostein, R. A. Kennedy and B. Ottersten, "Optimal Training Sequences for Joint Timing Synchronization and Channel Estimation in Distributed Communication Networks," *IEEE Transactions on Communications*, vol. 61, no. 7, pp. 3002-3015, July 2013.

MIMO Phase Noise

[J4] H. Mehrpouyan, **A. A. Nasir**, S. D. Blostein, T. Eriksson, G. K. Karagiannidis, and T. Svensson, "Joint Estimation of Channel and Oscillator Phase Noise in MIMO Systems", *IEEE Transactions on Signal Processing*, vol. 60, no. 9, pp. 4790-4807, Sep. 2012.

Particle Filters

[J3] **A. A. Nasir**, S. Durrani and R. A. Kennedy, "Particle Filters for Joint Timing and Carrier Estimation: Improved Resampling Guidelines and Weighted Bayesian Cramer-Rao Bounds," *IEEE Transactions on Communications*, vol. 60, no. 5, pp. 1407-1419, May 2012.

Cooperative Communications

[J2] **A. A. Nasir**, H. Mehrpouyan, S. D. Blostein, S. Durrani, and R. A. Kennedy,"Timing and Carrier Synchronization with Channel Estimation in Multi-Relay Cooperative Networks" , *IEEE Transactions on Signal Processing*, vol. 60, no. 2, pp. 793-811, Feb. 2012.

Blind Distributed MISO

[J1] **A. A. Nasir**, S. Durrani and R. A. Kennedy,"Blind Timing and Carrier Synchronization in Distributed MIMO Communication Systems," *IET Communications*, vol. 5, no. 7, pp. 1028-1037, May 2011.

Conference Publications

Network Coding

[C17] M. S. Karim, N. Aboutorab, **A. A. Nasir**, and P. Sadeghi, "Decoding Delay Reduction in Network Coded Cooperative Systems with Intermittent Status Update", in *Proc. IEEE Information Theory Workshop (ITW)*, Hobart, Tasamania, Australia, November 2-5, 2014.

Phase Noise

[C16] O. H. Salim, **A. A. Nasir**, W. Xiang, and R. A. Kennedy, "Joint Channel, Phase Noise, and Carrier Frequency Offset Estimation in Cooperative OFDM Systems", in *Proc. IEEE International Conference on Communications (ICC)*, Sydney, Australia, June 10-14, 2014.

Wireless Power Transfer

[C15] **A. A. Nasir**, X. Zhou, S. Durrani and R. A. Kennedy, "Throughput and Ergodic Capacity of Wireless Energy Harvesting Based DF Relaying Network", in *Proc. IEEE International Conference on Communications (ICC)*, Sydney, Australia, June 10-14, 2014.

Two-way Relaying Network

[C14] **A. A. Nasir**, H. Mehrpouyan, S. Durrani, S. Blostein, and R. A. Kennedy, "Training-Based Synchronization and Channel Estimation in AF Two-Way Relaying Networks", in *Proc. International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Toronto, Canada, Jun. 22-25 2014.

Cramer-Rao Bound

[C13] **A. A. Nasir**, H. Mehrpouyan, and R. A. Kennedy, "New Expression for the Functional Transformation of the Vector Cramer-Rao Lower Bound", in *Proc. IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Darmstadt, Germany, Jun. 16-19, 2013.

OFDM Phase Noise

[C12] O. H. Salim, **A. A. Nasir**, H. Mehrpouyan, and W. Xiang "Phase Noise and Carrier Frequency Offset in OFDM systems: Joint Estimation and Hybrid Cramer-Rao Lower Bound", in *Proc. IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Darmstadt, Germany, Jun. 16-19, 2013.

Cooperative Communications

[C11] **A. A. Nasir**, H. Mehrpouyan, S. Durrani, S. Blostein, R. A. Kennedy and B. Ottersten, "DSTBC based DF Cooperative Networks in the Presence of Timing and Frequency Offsets", in *Proc. IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Darmstadt, Germany, Jun. 16-19, 2013.

MIMO Phase Noise

[C10] H. Mehrpouyan, **A. A. Nasir**, T. Eriksson, S. D. Blostein, G. K. Karagiannidis, and T. Svensson "Time-Varying Phase Noise and Channel Estimation in MIMO Systems", in *Proc. IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Cesme, Turkey, Jun. 17-20, 2012.

Cooperative Communications

[C9] **A. A. Nasir**, S. Durrani and R. A. Kennedy, "Estimation of Synchronization Parameters in AF Cooperative Networks", in *Proc. IEEE International Conference on Communications (ICC)*, Ottawa, Canada, June 10-15, 2012.

Cooperative Communications

[C8] **A. A. Nasir**, S. Durrani and R. A. Kennedy, "Achieving Cooperative Diversity with Multiple Frequency Offset Estimation" , in *Proc. IEEE International Conference on Signal Processing and Communication Systems (ICSPCS)*, Honolulu, USA, Dec. 12-14, 2011.

Blind Cooperative Communication

[C7] **A. A. Nasir**, S. Durrani and R. A. Kennedy,"Blind Timing and Carrier Synchronization in Decode and Forward Cooperative Systems", in *Proc. IEEE International Conference on Communications (ICC)*, Kyoto, Japan, June 5-9, 2011.

Particle Filters

[C6] **A. A. Nasir**, S. Durrani and R. A. Kennedy,"Mixture Kalman Filtering for joint carrier recovery and channel estimation in time-selective Rayleigh fading channels", in *Proc. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Prague, Czech Republic, May 22-27, 2011.

Particle Filters

[C5] **A. A. Nasir**, S. Durrani and R. A. Kennedy, "Particle Filter for Joint Blind Carrier Frequency Offset Estimation and Data Detection", in *Proc. IEEE International Conference on Signal Processing and Communication Systems (ICSPCS)*, Gold Coast, Australia, Dec. 13-15, 2010.

Synchronization in OFDM

[C4] **A. A. Nasir**, S. Durrani and R. A. Kennedy, "Performance of Coarse and Fine Timing Synchronization in OFDM Receivers", in *Proc. IEEE 2nd International Conference on Future Computer and Communication (ICFCC)*, vol. 2, Wuhan, China, 21-24 May, 2010, pp. 412-416

Blind Equalization & Synchronization

[C3] **A. A. Nasir**, S. Durrani and R. A. Kennedy, “Blind Fractionally Spaced Equalization and Timing Synchronization in Wireless Fading Channels", in *Proc. 2nd International Conference on Future Computer and Communication (ICFCC)*, vol. 3, Wuhan, China, 21-24 May, 2010, pp. 15-19.

Blind Equalization & Synchronization

[C2] **A. A. Nasir**, S. Durrani and R. A. Kennedy, “Modified Constant Modulus Algorithm for joint blind equalization and synchronization", in *Proc. IEEE Australian Communication Theory Workshop (AUSCTW)*, Canberra, Australia, pp. 59-64 Feb. 2010.

Systolic Architectures on FPGA

[C1] F. A. Khan, R. A. Ashraf, Q. H. Abbasi, **A. A. Nasir**. "Resource Efficient Parallel Architectures of Linear Matrix Algebra for Real Time Control Systems on Reconfigurable Logic", in *Proc. IEEE 2nd International Conference on Electrical Engineering (ICEE)*, Lahore, Pakistan. 25-26 Mar. 2008.

Research Collaborators

- **Professor Bjorn Ottersten**: University of Luxembourg, Luxembourg, Fellow of IEEE. Collaborating on transceiver design and training sequence design in the presence of multiple channels and synchronization parameters
- **Professor George K. Karagiannidis**: Aristotle University of Thessaloniki, Greece. Editor in Chief of IEEE Communications and Senior Member of IEEE. Collaborating on joint channel and phase noise estimation in MIMO systems.
- **Professor Robert Schober**: University of British Columbia (UBC), Canada, Editor in Chief of IEEE Transactions on Communications. Fellow of IEEE. Collaborating on performance analysis and estimation of system parameters, i.e., phase noise for MIMO systems.
- **Professor Yingbo Hua**: University of California, Riverside, Fellow of IEEE. Collaborating on performance analysis and estimation of system parameters, i.e., phase noise for MIMO systems.
- **Professor Steven D. Blostein**: Queen’s University, Canada, Associate Editor of IEEE Transactions on Wireless Communications and Senior Member of IEEE. Collaborating on a wide range of topics such as synchronization and channel estimation in cooperative communication systems.
- **Professor Rodney A. Kennedy**: Australian National University, Australia. Fellow of IEEE. Collaborating on a wide range of topics such as simultaneous wireless information and power transfer and data-aided and non-data-aided synchronization and channel estimation.
- **Professor Thomas Eriksson**: Chalmers University of Technology, Sweden. Collaborating on receiver design and channel and phase noise estimation in MIMO systems.
- **Professor Tommy Svensson**: Chalmers University of Technology, Sweden, Senior Member of IEEE. Collaborating on receiver design and channel and phase noise estimation in MIMO systems.
- **Dr. Salman Durrani**: Australian National University, Australia. Senior Member of IEEE. Collaborating on a wide range of topics such as simultaneous wireless information and power transfer and data-aided and non-data-aided synchronization and channel estimation.
- **Dr. Xiangyun (Sean) Zhou**: Australian National University, Australia, Member of IEEE. Collaborating on simultaneous wireless information and power transmission.

- **Dr. Hani Mehrpouyan**: California State University, Bakersfield, USA, Member of IEEE. Collaborating on channel and synchronization parameter estimation in cooperative networks.

Students

- **Omar Hazim Salim**: Ph.D. student at the University of Southern Queensland, Australia. Signal processing algorithms for cooperative and MIMO-OFDM systems and digital signal processing implementation for 3-D video digital receivers. August of 2012-preesent (co-supervision).
- **Arif Önder Isikman**: Master student at Chalmers University of Technology. Iterative coded detection and estimation in MIMO systems affected by phase noise. October of 2012-present
- **Ghulam Mujaddad**: Master student at the Australian National University, Canberra, Australia. Smart Grid Communications. December of 2012-present (thesis supervisor).
- **Chian Chuah**: Undergraduate student at the Australian National University, Canberra, Australia. Channel estimation for AF relaying cooperative systems. November of 2012-present (thesis supervisor).
- Undergraduate student at Center for Advanced Studies in Engineering (CASE), Islamabad, Pakistan. Spectrum Sensing through Matched Filtering in Cognitive Radios. January 2009-June 2009 (co-supervision).

Selected Talks and Presentations

- "Throughput and Ergodic Capacity of Wireless Energy Harvesting Based DF Relaying Network", presented at *IEEE ICC*, June 2014.
- "Throughput and Ergodic Capacity of Wireless Energy Harvesting Based DF Relaying Network", ASP Seminar Series, The Australian National University, May 2014.
- "Timing and Carrier Synchronization with Channel Estimation in Multi-Relay Cooperative Networks", ASP Seminar Series, The Australian National University, May 2012.
- "Mixture Kalman Filtering for joint carrier recovery and channel estimation in time-selective Rayleigh fading channels", Department of Signals and Systems, Chalmers University of Technology., Jun. 2011.
- "Mixture Kalman Filtering for joint carrier recovery and channel estimation in time-selective Rayleigh fading channels", presented at *IEEE ICASSP*, May 2011.
- "Blind Timing and Carrier Synchronization in Decode and Forward Cooperative Systems", presented at *IEEE AusCTW*, Feb. 2011.
- "Particle Filter for Joint Blind Carrier Frequency Offset Estimation and Data Detection", presented at *IEEE ICSPCS*, Dec. 2010.
- "Particle Filter for Joint Blind Carrier Frequency Offset Estimation and Data Detection", ASP Seminar Series, The Australian National University, Nov. 2010.
- "Modified Constant Modulus Algorithm for joint blind equalization and synchronization", ASP Seminar Series, The Australian National University, Jun. 2010
- "Modified Constant Modulus Algorithm for joint blind equalization and synchronization", presented at *IEEE AusCTW*, Feb. 2010.

Professional Activities

Journal Editor

- **Associate Editor** of IEEE Canadian Journal of Electrical and Computer Engineering (February 2013-present)

TPC for Conferences

- IEEE International Conference on Communications (ICC), 2014
- IEEE Vehicular Technology Conference (VTC) Fall, 2014

Technical Reviewer for Journals

- IEEE Transactions on Signal Processing
- IEEE Transactions on Wireless Communications
- IEEE Transactions on Communications
- IEEE Transactions on Vehicular Technology
- IEEE Journal on Selected Areas in Communications
- IEEE Signal Processing Letters
- IEEE Communication Letters
- IEEE Wireless Communication Letters
- IEEE Canadian Journal on Electrical and Computer Engineering
- EURASIP Journal on Wireless Communications and Networking
- ETRI Journal
- IET Radar, Sonar and Navigation
- KSII Transactions on Internet and Information Systems

Technical Reviewer for Conferences

- IEEE International Conference on Communications (ICC), 2012,2013, 2014
- IEEE Global Communications Conference (GLOBECOM), 2010,2012
- IEEE International Conference on Personal Indoor Mobile Radio Communications , (PIMRC), 2011,2012
- IEEE Vehicular Technology Conference, (VTC), Fall 2011, Spring 2011, Spring 2012, Fall 2012, Spring 2013, Fall 2013
- IEEE Wireless Communications and Networking Conference, (WCNC), 2012
- IEEE International Conference on Signal Processing and Communication Systems (ICSPCS), 2010, 2011, 2012
- IEEE International Conference on ICT Convergence, (ICTC), 2012
- IEEE Australian Commun. Theory Workshop (AusCTW), 2010, 2011, 2012

Major Coursework

- Advanced Communication Theory
- Signal Processing
- Digital Communications
- Communication Systems

- Transmission Lines & Antennas
- Computer Networks
- Control Systems
- Microwave & Optical Techniques
- Computer Architectures
- Electronic System Design

Hardware Projects

Computer Architecture — *Implementation of Systolic Architecture for Matrix Computations on FPGA*

Computer Hardware — *Wireless communication between 2 computers via serial port*

Communication Systems — *AM Radio on PCB Board*

Power Electronics — *Starting of Switch Reluctance Motor*

Software Projects

Signal Processing — *LORAN-C Receiver in MATLAB*

Microwave — *Design of Wilkinson power divider at central frequency of 1GHz.*

Skill Set

Operating Systems — All Microsoft™ operating systems

Programming Languages

Object-Oriented — C, Java

HDL — Verilog

Design Tools

Xilinx — ISE

Scientific — MatLab™

Office Automation — LaTeX, Microsoft Office™

Languages

Urdu — Fluent (mother tongue)

English — Fluent

References

Prof. Dr. Rodney A. Kennedy
Dept. of Information Engineering
College of Engineering & Computer Science
The Australian National University, Australia
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Canberra ACT 0200
Phone:(+61) 2 6125 8604
Email: rodney.kennedy@anu.edu.au
Web: http://web.mac.com/rodken/

Dr. Salman Durrani
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College of Engineering & Computer Science
The Australian National University, Australia
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Canberra ACT 0200
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and Computer Scienece
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