

Proceedings of the
7th International Conference Confluence 2017
On
Cloud Computing, Data Science and
Engineering

12th – 13th January 2017
Amity University
Noida, Uttar Pradesh, India

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About Amity



Dr. Ashok K. Chauhan

*Founder President, Ritnand Balved Education Foundation (RBEF),
(The Foundation of Amity Institutions and the Sponsoring Body
of Amity Universities),
Chairman, AKC Group of Companies*

Dr. Ashok K. Chauhan, a renowned educationalist, industrialist, philanthropist and an immensely successful entrepreneur in Europe for over three decades. With an aim of bringing together some of the brightest minds from all arenas he established the not-for-profit Ritnand Balved Education Foundation. He has provided a platform to youngsters by giving them global level professional education while instilling in them a sense of values.

Today, Dr. Chauhan's vision has translated into internationally benchmarked campuses that have come to epitomise the Amity Education Group. Currently the group comprising of 8 universities, 25 schools & pre schools and 150+ institutions, is home to over 150,000 students pursuing 300 programmes from pre-nursery to Ph.D across campuses spread over 1000 acres. This tremendous and unmatched growth of Amity is a culmination of hi-tech campuses, dedicated faculty and unparalleled corporate interaction.

Grounded to his dreams, he has always believed in the policy of leading one eye on vision and one eye on implementation. It is therefore no surprise that Dr. Chauhan's innovative and far sighted strategies have transformed the education landscape of the country.

He is the man who gave us the golden success mantra of four 'E's – Edge, Enthusiasm, Excellence and Execution in all walks of life.

About Amity



Dr. Atul Chauhan

*Chancellor, Amity University Uttar Pradesh,
President, Ritmand Balved Education Foundation,
CEO, AKC Group of Companies*

Dr. Atul Chauhan is the President of the not-for-profit Ritmand Balved Education Foundation and the Chancellor of Amity University. Dr. Chauhan is also the CEO of the AKC Group of Companies which has worldwide interests in the fields of plastics, healthcare and technology. Amity is a leading not-for-profit education group of India with over 150,000 students across London, Dubai, Singapore, New York, Abu Dhabi, China, Mauritius, South Africa & Romania, besides India.

Dr. Chauhan is a member of many government and statutory bodies. Born and brought up in Germany, Dr. Chauhan had his higher education in the field of engineering and finance from University College London and London School of Economics.

His vision is to create centres of thought leadership across the world, where faculty, scientists and brilliant students can explore and expand the frontiers of knowledge.

Amity University at a Glance

Amity University, the flagship institution of Amity Education Group, is India's no. 1 ranked not-for-profit private University with a strong focus on research and innovation. It has been recognised as 'India's Best Research University' and 'Best University for Placements' by the Indian Education Awards 2015 & 2016 respectively and was also ranked among the top universities by QS among the top 200 Universities in Asia.

Amity has set a new standard of academic excellence in India by becoming Asia's only not-for-profit university to be awarded US Regional Accreditation by WASC Senior College and University Commission, USA - considered the Gold Standard of Accreditations globally.

It has also been ranked among the top universities globally by THE HIGHER EDUCATION, the world's leading publication on higher education.

Amity is a leading global education group, established over 2 decades ago Today, Amity is home to over 150,000 brilliant students across Pre-nursery to Ph.D. levels pursuing more than 300 Programmes in 60 diverse disciplines.

The Group is driven by its vision of building up a Global Knowledge Network providing globally benchmarked education. Today the Group comprises of 9 Universities; 25 schools and 10 international campuses across London, Singapore, Dubai, New York, Mauritius, China, Abu Dhabi, South Africa and Romania, amongst others.

With a focus on Outcome Based Education, Amity offers various programmes at bachelors, masters and doctoral level. University offers different programmes in Engineering, Bio Sciences, Architecture, Telecom, Arts, Journalism and Communication, Management, Humanities, Social Sciences, Education, Hospitality, Law, Insurance, Health and Allied Sciences and also Distance Learning. The programmes offered at AUUP are based on Choice Based Credit System and are designed to ensure holistic learning and aims at developing academic excellence, enhancing life skills and imparting experiential learning.

Amity's relentless pursuit of excellence is reflected in its steadfast commitment and continuing investment towards cutting-edge research and innovation. For instance, Amity in the last four years has filed over 750 patents, which as per the Annual Report of the Controller General of Patents, Government of India, is by far the highest number of patents filed by any Indian University. It is also engaged in conducting over 300 hi-end Government funded as well as international research projects including those funded by Bill & Melinda Gates Foundation, USAID, and Leverhulme Trust, UK.

The University is also committed to bridge the gap between academics and industry. The in-house, award-winning Incubator, which has nurtured over 100 companies and attracted over USD 40 million investments in the last few years, is a step towards that very end. These are just few of the reasons why Government of India has recognised Amity as a 'Scientific & Industrial Research Organisation' (SIRO).

In the field of management, the University has developed over 1,600 case studies in the past years that have been bought across 62 countries by over 490 leading institutions and organisations like Harvard, Stanford, Oxford, McKinsey, and KPMG amongst others.

Amity has also established merit scholarship programme wherein scholarships have been awarded to over 25,000 students. It is one of the few Universities in India to offer these bright students a choice of over 300 Degree programmes across 60 diverse disciplines.

Amity's Career Resources team of 60 dedicated members ensures top-of-the-line placements and higher study opportunities for its students globally. In fact, Amity has facilitated over 27,000 campus placements in the last years.

Today the Amity community of outstanding students has exceeded over 120,000 alumni worldwide, who are successfully pursuing their career in top organizations or pursuing further studies at leading institutions in top global universities like Stanford, Oxford, Harvard and Columbia’.

Amity’s unwavering focus on research and innovation, globally benchmarked infrastructure, and teaching pedagogy, has led to the University being awarded the highest 'A' grade accreditation by NAAC (National Assessment & Accreditation Council) - a distinction awarded to only 10% of Indian Universities.

In addition, Amity University Uttar Pradesh is proud to be the first Indian University to be accredited by The Institute of Engineering & Technology (IET, UK) for its Engineering programmes. Further, AUUP has also been accredited by the Accreditation Council for Business Schools & Programmes (ACBSP, USA) for its Management programmes; Accredited by Royal Institute of Chartered Surveyors (RICS, UK) for Real Estate & Construction Programmes ; accredited by European Foundation for Management Development – Technology Enhancement Learning (EFMD-CEL, Belgium) for online MBA Programmes; Accredited / Certified by UNWTO.TedQual, Andorra for Travel & Tourism Programmes.

This pursuit of excellence has also resulted in Amity Institutes being ranked among the very top in India in areas of Management, Engineering, Biotechnology, Hospitality, Law, Insurance and Telecom in various prestigious surveys conducted by leading publications.

Messages

Patron's Message



Prof. (Dr.) Balvinder Shukla
*Professor -Entrepreneurship & Leadership,
Vice Chancellor, Amity University, Uttar
Pradesh*

It is a matter of great pride and privilege for me to share that Department of Computer Science and Engineering, Amity School of Engineering and Technology, is organising its 7th International Conference-**Confluence 2017** on the **theme 'Cloud Computing, Data Science and Engineering'** on **January 12-13, 2017** at Amity University Uttar Pradesh.

The theme of the Conference is of great importance to the modern world and specifically to India, a country, where digitalization is taking a leap everywhere. Every individual is dependent on technology and is affected by information around them. In such a dynamic evolutionary environment, **CONFLUENCE 2017** is an opportune forum to bring stakeholders, technicians, scholars, academicians and students together to contribute and learn from each other by sharing their knowledge, experiences and innovations.

Keynote Talks, Technical Symposia, Tutorials, Panel Discussion and Interactive Workshops will be the highlights of Confluence 2017 which makes it unique. The participants will certainly benefit immensely from these meaningful presentations, discussions and deliberations being held in this 2 days conference.

Amity School of Engineering and Technology has partnered with some of the world's top universities including **Memorial University of Newfoundland, Canada, University of Florida, USA, University of Western Sydney, Australia, Queen's University, Belfast, UK, Deakin University, Australia, Clouds Lab, University of Melbourne, Australia and University of Massachusetts, Lowell** to bring the best of the world's industry and academicians together under one roof.

I am delighted to note that more than 500 distinguished researchers and scientists from India and abroad have contributed in the form of research papers on diverse IT related domains, in this conference. Amongst these, 148 abstracts have been published in this Abstract book. I am sure this will be a very useful referral source to engineers, academicians and industry professionals from public and private sectors who strive to update their knowledge on the advances made in IT sector.

I am very proud of the remarkable efforts of the Organising Team to organize this conference at such a large scale. The dedication and perseverance of each member of the organising committee to achieve excellence for creating a global platform of knowledge and ideas, is highly appreciated.

My Compliments and best wishes to all the delegates, guests, distinguished speakers and students for success of the Confluence 2017!

Wishing you all a very happy, promising and rewarding new year 2017!

General Chair Message



Prof. (Dr.) Abhay Bansal

*SMIEEE (U.S.A), MCP, SMCSI, LMISTE, MIEEE-CIS, MIAENG, CEng,
SMIACSIT, MACM, FIE (I), FIETE, FIET (UK),*

Joint Acting Head, ASET & ASE,

Director, International Collaboration for Engineering & Technology Head,

Department of Computer Science & Engineering,

ASET Amity University Uttar Pradesh

It gives me immense pleasure to share that Amity School of Engineering & Technology is hosting the 7th **International Conference Confluence 2017 – themed on Cloud Computing, Data Science & Engineering**. Every year the Department of Computer Science and Engineering hosts the annual conference which caters to enlightening budding technology enthusiasts and this year the Confluence is focused on discussing technology trends in Cloud Computing and Data Sciences, paving a way towards a smarter future.

To full fill the vision of our Hon'ble Founder President **Dr. Ashok Chauhan for Amity to be among the best university in the world and under leadership of Hon'ble Chancellor, Dr. Atul Chauhan**, Amity School of Engineering & Technology has collaborated with the top ranked Universities of the world, including **University of Florida, University of Western Sydney, Memorial University of Newfoundland, Canada, University of Melbourne, Australia, University of Massachusetts, USA, Queen's University Belfast and Deakin University, Australia**. This would not have been possible without the vision, blessings and guidance of the management and the commitment of one and all involved in organizing this conference. Our patrons for this years Conference are **Dell EMC Corporation and IEEE**. We also have associated with **ISRO** (Indian Space Research Organization), **ICMR** (Indian Council of Medical Research) and **D-Link Academy** as our supporters for the conference.

Confluence 2017 is a platform that would enable exchange and collaboration of ideas for technical innovation. This year we have over 539 research papers submissions from which only 149 papers of high technical quality were selected after a rigorous review process. It was a challenging task and I thank all the review committee members for their time and valuable support to maintain the quality of the conference.

More than 50 keynote speakers from more than 20 countries would deliberate during the conference. The invited speakers of the conference are from all parts of the world thereby making it an apt platform for exchange of knowledge and synergies.

I thank all academic partners, sponsors, technical sponsors, faculty members and the students who have worked diligently to make this conference possible. I hope that this conference turns out to be a platform for new innovations. I wish this event a huge success and hope that the participants have two days of fruitful life time experience.

Forewords



भारत सरकार
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समन्वय निदेशालय पुलिस बेतार
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Ministry of Home Affairs
Directorate of Coordination
Police Wireless
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दिनांक / Date ...०५/०१/२०१७
सं./No.

Foreword

I am glad to learn that Department of Computer Science and Engineering, Amity School of Engineering and Technology is organizing its 7th International Conference themed on **Cloud Computing, Data Science Engineering**. Confluence over the years have set a milestone in helping research scholars and industry leaders from all over the world interact and discuss the global challenges faced by the IT industry in today's world and the possible solutions for the same. I extend my heartiest congratulations to Dr. Abhay Bansal, faculty and students of Computer Science Department for organizing and bringing scholars on one platform through this conference with the theme: Cloud Computing, Data Science and Engineering.

The practice of using a network of remote servers hosted on the internet to store, manage, and process data, rather than a local server. Big Data coupled with cloud computing is termed as one of the biggest emerging technologies in industries. The solution is to use innovative ways with which we can integrate these data sources to derive business insights and form business intelligence in the core of concerned industries. These solutions will not only help us today but will tip us to predict tomorrow's business scenarios successfully.

Confluence is a global platform which enables to collaborate, share ideas and learn. Such conferences give an opportunity to young minds to learn and take ideas to prosper from top industry experts, scholars and students of various other Universities. They have the inclination and advantage of using innovative methods to solve conventional problems and make the world ready.

I extend my heartiest congratulations to the organising team of Confluence 2017.


(K.C.SHARMA)
JOINT DIRECTOR

Message



Karen S. Pedersen, P.E.
2017 IEEE-USA President

IEEE-USA PRESIDENTIAL MESSAGE TO IEEE CONFLUENCE 2017

Congratulations from IEEE-USA to the organizers and participants in Confluence 2017, the 7th International Conference on Cloud Computing, Data Science and Engineering, to be held 12-13 January 2017 at Amity University in Noida, Uttar Pradesh.

New and emerging Information technologies in such areas as cloud computing and data science are rapidly changing how companies compete, how managers manage, and how people live and work around the globe. It is incumbent as a profession that we not only help advance technology by facilitating our members research and innovation in these cutting edge fields, but that we also take time to reflect on the broader implications of those technologies and reinforce design principles and applications that are ethically and socially sustainable.

By leveraging the strong technical reputation of the host Amity University and the support of the IEEE Uttar Pradesh Section, by bringing together a diverse array of experts from around the world as keynoters and panelists, and by engaging industry and academic leaders as co-sponsors, you have provided an excellent setting in which participants can foster research relationships, staying current on the latest technology and upcoming trends, and discuss issues of interest and concern in areas both technical and societal in nature.

On behalf of your IEEE colleagues in the United States, we applaud your efforts and wish you great success.

Message



Jim Jefferies
IEEE President Elect

Confluence – 2017 Attendees

I would like to offer my thanks and recognition to the organizers and supporters of Confluence-2017. As an international event focused on the field of Cloud Computing, Data Science, and Engineering, Confluence 2017 can have the impact that it plans on expanding the understanding and implications of big data and the environments in which it is collected and managed. With the megatrends already in place, it is important to develop the skills needed to deal with the expansion and to meet the demands on creation, availability, and ultimate security. Linking the research to the impact on engineering and business is of high value. There are also significant career implications for society and for developing individuals that will be equipped to lead these trends.

Also thanks to Amity University for again hosting this 7th Conference event. It is an important need to understand the implications and potential impacts. IEEE has had major initiatives in Big Data, Cloud Computing, and the underlying Internet of Things. May Confluence-2017 achieve your aims and may the resulting output of shared experiences and information be an additional, significant contribution to the IEEE objective of Advancing Technology for Humanity.

Have a great and meaningful Conference!

Foreword



Sudhir Aggarwal

Vice President and Head Government Relations
Thomson Reuters South Asia Private Limited

Data labs are the future of education in India

The Education sector in India is poised to grow at a breakneck pace. As a priority spend area, education already holds the second-highest share of wallet for middle-class households in India. This coupled with India's demographics and various initiatives by the Government such as Digital India to boost education penetration in the country, presents a unique opportunity to players in the industry.

Government's efforts towards digitization of education industry are changing the learning as well as the teaching process to a large extent. While e-learning centers and education applications/e-modules for the mobile device are revolutionizing the primary education, digitization has enabled higher education in the country to move beyond theoretical approach to simulate real-life problem solving. This shift has greatly contributed towards making the students agile and industry ready.

As data led analytics and data science gain prominence across each and every industry in the country, education in India must keep pace with the emerging trend. In a fast moving economy, it is imperative that the students are well-trained to study data at the very beginning of their professional careers. Setting up data labs to facilitate decoding of data to understand trends and formulate strategy, therefore, must become an integral part of the curriculum.

At Thomson Reuters, we are very proud of our existing relationships with the best education institutions in the country, and it is our aim to further expand this association and bring trusted data to the students. Our flagship solutions in the financial markets and legal areas can be deployed effectively to facilitate finance labs and legal tools that provide students with practical learning platforms.

It gives me immense pleasure to note that a credible university such as AMITY is organizing events and creating platforms to further the awareness about the importance of data science. I am very proud to be associated with CONFLUENCE 2017 and wish them great success.

Freie Universität Berlin, Institut für Informatik
Takustr. 9, 14195 Berlin

To the organizers and delegates of the
7th International Confluence 2017 –
Cloud Computing and Data Science & Engineering
at Amity School of Engineering and Technology

Freie Universität Berlin
FB Mathematik und Informatik
Institut für Informatik und
Institut für Bioinformatik

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27. Dezember 2016

Dear organizers and delegates of Confluence 2017,

It is a pleasure and an honor having been invited to present my research at the **7th International Confluence 2017–themed Cloud Computing and Data Science & Engineering**, sponsored by **IEEE** and hosted by Amity School of Engineering and Technology.

Having myself worked in international projects like the European DataGrid (EDG), Enabling Grids for E-science (EGEE) and the Open Middleware Infrastructure Institute-Europe (OMIIEurope), I share the conviction that **Cloud Computing and Data Science & Engineering**, and more in general data-intensive distributed computing, is one of the most important emerging technologies for applications in both academia and industry. With this in mind, it is evident that the 7th International Confluence 2017 provides a great international platform to bring various stakeholders together, helping to exchange knowledge and hopefully create new or intensify existing collaborations.

In the last ten years my research focus has shifted from distributed computing, which can be viewed as an “enabling technology”, towards data-intensive bioinformatics and computational biology, which increasingly rely on distributed infrastructures. Therefore, my contribution to Confluence 2017 will not focus directly on Cloud Computing and Data Science & Engineering itself, but will complement the conference's main theme by introducing an interesting use case for which such technologies are devised and deployed in the first place. I am grateful to all the organizers and delegates—who made this conference series possible—for the opportunity to present my work in such an exiting context. I am convinced that your efforts and dedication will make the event a grand success, and that this success will help in continuing Confluence's successful tradition also in the future. Thank you for letting me be a part of it. I am looking forward to meeting you at the conference.

Best regards,



(Prof. Dr. Rosario M. Piro)



Greetings from the land of the orient pearl, Philippines!

I congratulate Amity University for hosting the 7th International Conference on Cloud Computing, Data Science & Engineering. Kudos to the team who works hard to make this event a success and memorable to everyone!

Conferences like this are one of the academic gatherings that I always look forward. Academicians and all stakeholders must converge, meet and network each other to prepare the world for this computing revolution. Indeed, the world today is re-landscaped by cloud and data through science and technology.

It is truly my great honor to be part of this remarkable confluence of minds and intelligence towards a better and bolder cloud computing, data science and engineering. Moreover, I am excited to visit incredible India and Amity University!

Mabuhay!

A handwritten signature in blue ink, appearing to read 'Dave Marcial'.

Prof. (Dr.) Dave Marcial
Dean, College of Computer Studies
Silliman University
Philippines



Peter Robinson ScD CEng
Professor of Computer Technology

Professor Abhay Bansal
Amity School of Engineering & Technology
Amity University UP
Noida – 201313 India

4 January 2017

Dear Professor Bansal,

Confluence 2017

I was delighted to hear that the Department of Computer Science and Engineering at Amity University is organizing its 7th International Conference. The Confluence conferences have provided an excellent opportunity for research scholars and industrial leaders from around the world to meet and discuss the global challenges faced by the IT industry today.

I very grateful to you and your team for organizing this conference with the theme Cloud Computing, Data Science and Engineering. It is very encouraging to hear that over 500 research papers have been submitted to Confluence, with contributions from research students and established academics at both the national and international levels. The 50 keynote speakers attest to the conference's popularity.

Data Science is one of the great opportunities facing modern industry and there are exciting challenges in mining and analyzing these data. The scale, diversity and volatility of the data all present serious academic problems. Cloud Computing and Data Science together form one of the most interesting emerging technologies for our industry. Innovative integration of these data sources will inform business insights and form business intelligence at the heart of all industries. These solutions will help us today and shape future business scenarios.

Confluence 2017 is a global opportunity to collaborate, share ideas and learn. Such conferences encourage two-way communication between innovative young minds and established industrial experts, opening new possibilities for interaction. Our future will be shaped by people who can use innovative methods to solve conventional problems to prepare us for an exciting future.

Yours sincerely,



Peter Robinson.

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Foreword

It gives me immense pleasure to learn that Amity University, in association with EMC Corporation will be organizing the 7th IEEE International Conference, **'CONFLUENCE 2017- Cloud Computing, Data Science & Engineering'** to be held at Amity University. Confluence has established itself as an international forum for the dissemination of quality research in all aspects of Cloud Computing, Big Data and Data Science and for fostering interaction and exchange of ideas amongst the experts.

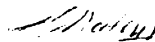
Amity University with its National and International recognitions has played a major role in the advancement of education and research in India. In particular, Department of Computer Science & Engineering, Amity School of Engineering & Technology, has contributed significantly in the enrichment of undergraduate and post-graduate studies and research in diverse areas of Information Science and Engineering.

The domains of Computer Science and Technology are developing at a breathtaking pace. They are the stepping-stones to the upcoming future of Information Technology, which will establish resources much needed to foster the digital economy and society.

Cloud Computing has turned computing and software into commodity services, thus creating new technologies and a business revolution. Big Data is a key to exploring the business insights and economics of services. IEEE International Conference on 'Cloud Security and Big Data' (CONFLUENCE 2017) aims to provide an international forum to discuss the prospects, challenges and solutions in the realm of this new technology.

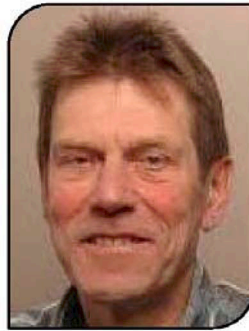
The two days of CONFLUENCE 2017 will involve a multitude of scientists, researchers and experts from industries and academia. The deliberations that ensue will lead to recommendations for achieving the objectives of the assembly, so appositely focused in the theme of the conference.

I commend all academicians, scientists, and delegates from eminent institutes and various industries who have made significant contributions and helped in ensuring CONFLUENCE 2017 a grand success.



Professor Aditya Mathur
Head of Pillar, Information Systems Technology and Design, SUTD; and
Centre Director, iTrust

Date December 28 2016
Contact Person Sandra Wolff
Phone +31152782175
E-mail S.S.E.Wolff@tudelft.nl
Subject Foreword Message Confluence-2017



Prof. (Dr.) I.R. Jan van den Berg
Chair Cyber Security
Delft University of Technology/Leiden University
The Netherlands
Email: j.vandenberg@tudelft.nl

Confluence-2017: Cloud Computing and Data Science & Engineering

Enabled by the contemporary availability of massive amounts of data of all kind together with the abundant availability of enormous data processing power, often organized in 'the cloud', (Big) Data Science has become a new challenging research & engineering area. The promise put forward by this new technological push is that data science will provide us with all kinds of new decision support knowledge & insights.

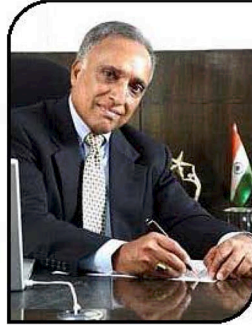
The true data engineer understands that, in practice, the successful application of data science starts with defining the right question: what do you wish to get out of the data: will it be an advice, a model that explains certain behavior, or, more advanced, a predictive model?

Having defined the key question to be answered, the next steps are around the collection of the data and the selection of appropriate means to preprocess & analyze them: here engineering comes in where the data science engineer, in close contact with experts from the application domain, tries to find an adequate or even 'optimal' answer, usually in an iterative way, full of trials and errors, as dictated by the 'no free lunch theorem'.

Next to these, mostly IT, challenges, the educated data engineer/researcher knows that other values are of importance as well: data are often related to people, which can make data science an enemy of privacy. More generally, making our lives dependent on 24/7 IT-data processing (like in the banking domains of transport, energy distribution, water supply, flood defense, and even warfare) introduces cyber security challenges we have to deal with.

May the Confluence-2017 conference contribute to all these challenges by addressing both the technological and non-technological (societal) issues related to the great promises of Cloud Computing and Data Science & Engineering.

Foreword



Mr. Rajan S. Mathews

Director General, Cellular Operators Association of India

Congratulations Amity, on organising, **Confluence 2017**. I am thankful and humbled by this honour that you have bestowed upon me. This is a testament to all the tremendous contribution which the telecommunications industry has made towards connecting millions of Indians and bringing them online. The mobile industry is empowering citizens and touching lives like never before. COAI is the definitive voice of the industry and has been instrumental in working closely with the government in ensuring a conducive and facilitative ecosystem for industrial growth and fostering innovation. Addressing an enthusiastic and bright batch of students is an enriching experience. Our lives are a sum total of our choices. We must make our choices early and in an informed manner to take charge of our lives and shape our own destinies. I have been privileged to be a part of an industry that has catalysed the digital revolution in the country, an industry that has solved some primary issues of a fast-growing economy.

With this competitive market and in the era of disruptive innovations, professionals get very little time to re-establish their position. Here, leaders' job becomes crucial. He/she has to anticipate the changing trends of the market, make mistakes and fail early, analyse situations and take quick actions. To fall is unavoidable in life's long journey but the brave are those, who rise from their falls stronger and faster. The most important path forward is the one paved through the courage of conviction and by being true to your values.

The industry, at present, is short of skilled manpower, while we create the most jobs in the country the industry needs young talent. We also need good leaders, motivated team players who can drive the team to not only achieve targets, but also innovate and think out of the box. I wish all the students and staff members of Amity all the very best and hope to welcome some of you into active service in the sector. Let's all work together for a fully connected and digitally empowered India.

Message



Mr. Keshav Bansal
Director, Intex Technologies (I) Limited

I take this opportunity to congratulate and give my Best Wishes to Amity University for the 7th International Conference, Confluence 2017. Being the seventh edition, it clearly brings to the fore the strong intent, focus and thought of the organizers.

Confluence since inception has been a platform and symbol of excellence for furthering technology for the cause of humanity. It has every year been successful in bringing together top technological and scientific minds under one roof to discuss, debate, exchange ideas and thereby envision the way forward in the field of Information Technology and Computer Science.

I am sure this edition will be even more insightful for the fraternity and technology enthusiasts than the previous ones giving out path breaking ideas, solutions and deliberations on what's in store for the future. Technologies like Artificial Intelligence, Cloud Computing, Internet of Things (IoT) and many more are sure to shape our future living.

This is just the beginning and am sure there will be many more milestones to come.

Here's wishing you all the best for the future!

Message



H.S. Samaddar

Sr. Technical Director

Government of India, Ministry of Electronics & IT
National Informatics Centre

The 7th IEEE International Conference **Confluence 2017- Cloud Computing and Data Science Engineering** to be held from 12th and 13th of January 2017 in association with Dell EMC, has established itself as a worldwide reference for dissemination of high quality research in all aspects of Cloud Computing, Big Data, Data Science and Engineering along with fostering interaction and exchange of ideas on a common platform to encourage and enlighten the students vision.

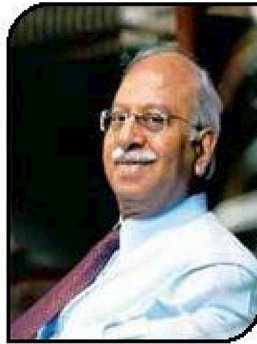
It is with great honour and we feel proud to hear that Confluence has a number of Technical and Academic partners like IEEE, Purdue University, USA, University of Massachusetts Lowell, USA, Queens University Belfast, UK, University of Florida, USA, University of Western Sydney, Australia, Queen's University, UK, University of Capetown, Progia LearnWare and Clouds Lab, University of Melbourne, Australia, CITANDA Department of Information Systems, Newfoundland University and Deakin University, Australia. We wish the next edition of Confluence has many such Universities partnering them.

As cloud computing turning computing and software into commodity services, everything as a service in other words, leads to technology as well as business revolution. Insights and impacts of various services (via infrastructure as a service, platform as a service, software as a service and business process as service) needs to be revisited. Big Data is a key enabler of exploring business insights and economics of services. This Conference visions to provide an International forum for leaders to formally explore various business insights of all kinds of value added services.

I am sure, that the deliberations during the confluence by the academicians, scientists, and delegates from eminent institutions and various industry dignitaries, who have made significant contribution in the field of Cloud Computing, Data Science and Engineering in the form of research papers, keynote sessions, workshops, etc would pave the way for future development and encourage the students to take their study one step further. We extend our heartiest congratulations to the organizing team of Confluence 2017 and thank them for bringing the eminent scholars on one stage to share their study, experience and ideas and create a learning environment. We are happy for Dr. Abhay Bansal and his team for putting up their sedulous dedication and hard work for the success of the conference to enlighten the vision of new technology.

Best wishes for the grand success of Confluence 2017!

Foreword



Saurabh Srivastava
Co founder and Past Chairman,
NASSCOM and TIE,
Co Founder, Indian Angel Network

Dear Prof Bansal,

Please accept my congratulations for holding Confluence -2017 for the 7th consecutive year. It is indeed impressive that the conference will have 31 distinguished keynote speakers from around the world and 539 research papers. These are a tribute to the standing of the Amity University and the hard work done by you and your team. I am indeed sorry that I will be overseas and will be unable to personally attend. Please do accept my very best wishes for the conference.

डा महेश शर्मा
Dr Mahesh Sharma



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Date: January 10, 2017

MESSAGE

Technology Evaluation in last couple of decades has emerged like Double-Edge sword, more so in Information and Technology space. This evolution has significantly changed the way of thinking and doing things for good, made the world a Global Village and opened a new era in human life.

In such a dynamic evolutionary World, the 7th **International Confluence 2017- themed on Cloud Security and Big Data Engineering** is an opportune forum to bring stakeholders together to contribute and learn from each other. The Confluence has been doing great contribution to the ecosystem through building and sustaining such an International platform.

I would like to applaud and extend my sincere appreciation to all the stakeholders for their initiatives, support and efforts in building and sustaining Confluence over years successfully. Congratulations to the team working on Confluence 2017 for all your efforts and dedication. I wish you best of luck and appreciation for making the event a grand success.

(Dr. Mahesh Sharma)

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Government of India, New Delhi

MESSAGE

Technology Evaluation in last couple of decades has emerged like Double-Edge sword, more so in Information and Technology space. This evolution has significantly changed the way of thinking and doing things for good, made the world a Global Village and opened a new era in human life. However, this comes with its own set of natural challenges in terms of much faster technology obsolescence never before, flip side of World causing newest challenges to society every day and pressure to remain competitive and relevant.

Cloud building and adoption is more around the Business Model. Cloud adoption needs to learn from Mobile revolution in India. Mobile revolution in India for masses happened around key phenomenon like Commercial availability at affordable price and availability of apps on mobile. It is good to learn from experience and build on for faster adoption like Cloud.

I would like to applaud and extend my sincere appreciation to all the stakeholders for their initiatives, support and efforts in building and sustaining Confluence over years successfully. Congratulations to the team working on Confluence 2017 for all your efforts and dedication. I wish you best of luck and appreciation for making the event a grand success.

(General (Dr.) VK Singh, PVSM, AVSM, YSM (Retd)

Preface

The IEEE sponsored 7th International Conference “**Confluence 2017 - Cloud Computing, Data Science and Engineering**” has been organized by **Department of Computer Science and Engineering**, Amity School of Engineering and Technology, Amity University, Noida, Uttar Pradesh in collaboration with Dell EMC². IEEE has taken the onus of publishing all the papers which have been accepted and presented in the Conference.

The main objective of organizing this summit is to exchange ideas and bridge the gap between industry and academia, while trying to take a sneak-peek into the future. The range of papers presented will ensure an interesting and enlightened discussion spread over a period of two days. **CONFLUENCE 2017** is a platform where the academic research communities, experts from industries, scientists and participants get together to exchange new ideas and share new research and developments in the field of **Cloud Computing, Data Science and Engineering** in today’s ubiquitous virtual environment.

Big companies, numerous research groups from academia, national governments and international institutions, not only propagate but actively use cloud services all around the world. The era of digitalization has seen not only the emergence, but the wide usage and accepting of Cloud Computing. Cloud benefits have many unique attributes that raise security challenges in areas of data security, recovery, access control, privacy and trusted computing. While the benefits of cloud computing are compelling, “Data Science” has become a ubiquitous term. It is an emerging paradigm applied to datasets whose size is beyond the ability of commonly used software tools to capture, manage and process the data within a tolerable elapsed time. The theme of the conference is the need of the hour as both the emerging technologies, Data Science Engineering and Cloud Security continue to converge and mutually promote each other.

We were very fortunate to develop a great level of interest in the community. The IEEE sponsored 7th International Conference; **CONFLUENCE 2017** received a huge participation of **539** manuscripts from around the world. All accepted & presented papers of the Conference by duly registered authors, will be submitted to IEEE Xplore Digital Library for Publication. These together with the poster presentations, speak volumes about the popularity and quality of the Confluence for exchanging ideas and finding solutions to Cloud Security and Data Science Engineering.

The conference provides a leading platform for propagating the latest advancements in research and development, themed mainly on “**Cloud Computing, Data Science & Engineering**” with various sub-themes much awaited and needed in today’s professional scenario.

We are grateful to the plethora of the eminent and distinguished speakers **Prof. (Dr.) Patrick Hanghui Then**, Swinburne University of Technology, Australia, **Prof. (Dr.) Bebo White**, Stanford University, USA, **Prof. (Dr.) Bipin C. Desai**, Concordia University, Canada, **Prof. (Dr.) Ruili Wang**, Massey University, New Zealand, **Prof. (Dr.) Jean-Paul Van Belle**, University of Cape Town, South Africa, **Prof. (Dr.) G. P. Li**, University of California, USA, **Prof. (Dr.) Atty Jocelle Batata – Sigue**, BNEFIT, Philippines, **Prof. (Dr.) Jan van Den Berg**, Delft University of Technology, Netherlands, **Prof. (Dr.) Sanjeev Baskiyar**, Auburn University, USA, **Prof. (Dr.) Amit K Mishra**, University of Cape Town, South Africa, **Prof. (Dr.) Parma Nand**, Auckland University, New Zealand, **Prof. (Dr.) Siti Norul Huda Sheikh Abdullah**, The National University of Malaysia, Malaysia, **Prof. (Dr.) Rosario M. Piro**, FREIE University of Berlin, Germany, **Prof. (Dr.) Azizur Rahman**, Charles Sturt University, Australia, **Prof. (Dr.) Simeon Simoff**, University of Western Sydney, Australia, **Prof. (Dr.) Faizal Khan**, Memorial University, Canada, **Prof. (Dr.) R Logeswaran**, Asia Pacific University, Malaysia, **Prof. (Dr.) Keshav Dahal**, University of The West of Scotland, Scotland, **Prof. (Dr.) Robin Doss**, Deakin University, Australia, **Prof. (Dr.) Diego Galar**, Lulea University of Technology, Sweden, **Prof. (Dr.) Adheesh Budree**, University of Cape Town, South Africa, **Prof. (Dr.) Ajith Abraham**, Machine Intelligence Research Lab, USA, **Prof. (Dr.) Suzanne Kieffer**, Vrije Univesiteit Brussels, Belgium, **Prof. (Dr.) Mirosław Starol**, Chalmers University of Gottingburg, Sweden, **Prof. (Dr.) Teo Yong Meng**, National University of Singapore, Singapore, **Prof. (Dr.) Manuel A. Uy.**, Carlos Hilado Memorial State College, Philippines, **Prof. (Dr.) Ethel Schuster**, Northern Essex Community College, London, **Prof. (Dr.) Mohammad S. Obaidat**, Fordham University, USA, **Prof. (Dr.) Chuchi Sumalpong Montenegro**, Silliman University, Philippines, **Prof. (Dr.) Haim Levkowitz**, University of Massachusetts, Lowell, **Prof. (Dr.) Dave E. Marcial**, Silliman University Philippines, **Prof. (Dr.) Dennis Peters**, Memorial University of

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It would be unfair to not acknowledge the constant unwavering support and expertise of outstanding researchers and leaders. The organizing committee, headed by **Prof. (Dr.) Abhay Bansal** take this opportunity to thank Chief Patrons **Dr. Ashok K. Chauhan** (Hon'ble Founder President -RBEF) and **Dr. Atul Chauhan** (Hon'ble Chancellor, Amity University Uttar Pradesh and President, RBEF), Patron **Dr. (Mrs.) Balvinder Shukla** (Hon'ble Vice Chancellor, Amity University, Noida), for their support and guidance. We would also like to extend our gratitude to the experts chairing various committees: Technical Committee Chair **Dr. S. K. Garg** (Pro-Vice Chancellor, Delhi Technical University), International Collaboration Chair **Dr. Mahendra Pratap** (CEO, Progia, USA), Publication Committee Chair **Prof. (Dr.) Ajoy Kumar Ray** (Director, IASET, Shibpur), Technical Session Committee Chair **Mr. Sudhir Agarwal** (Vice President and Head, Government Relations, Thomson Reuters), Publicity Committee Chair **Dr. Dilip Sharma** (Secretary, IEEE, UP Section, India), Industry Award Committee Chair **Dr. P. K. Gupta** (Senior Director and Chief Architect, EMC Corporation Singapore). Further, we also thank the **International Advisory Committee and the Review Committee** for their valuable contributions that made Confluence 2017 a remarkable success. We would like to express deep gratitude to our **Professional Partners**: IEEE UP Section, D-Link Academy, **Academic Partners**: University of Florida, University of Western Sydney, Clouds Lab, University of Melbourne, Australia, Deakin University, Australia, Memorial University of Newfoundland, Canada, **Media Partners**: Data Quest **Supporters**: Dell EMC Corporation, Indian Space Research Organization (ISRO), Indian Council of Medical Research (ICMR), Infinite Opportunities Abroad (IOA), Miraj Gold, Shade Square, SecureAplus Antivirus, Archies and **Beverage Partner**: Pepsi, for associating with us and supporting **Confluence 2017**.

The conference would not have been successful without the excellent papers and inspiring presentations presented by the participants. We thank all the keynote speakers, authors, presenters and delegates for their contribution in making Confluence 2017 a grand success.

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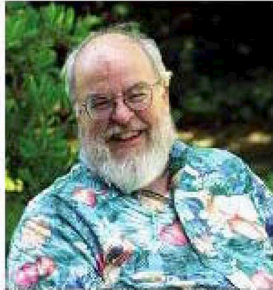
Ms. Abha Thakral, *Amity University Uttar Pradesh, India*

Keynote & Distinguished Speakers / Guests

Patrick Hang Hui Then is an active researcher with strong collaboration with industries. He has been actively publishing papers for journal, conference proceedings and book chapters. In parallel with his research work, he is also investing efforts into supervision of Masters and PhD students. He has been entrepreneurial by conducting research using fund that he won from sponsors outside SUTS such as Ministry of Science, Technology and Innovation (MOSTI). He is also excelling in project management by ensuring all milestones are met within the stipulated budget and deadlines. Besides his active role in research, he is also contributing high level of innovation into his teaching by mentoring and exposing his students to the real world of IT industry. Besides both research and teaching, Patrick has never ignored his administrative and leadership role as Associate Dean of this Faculty and Head of a research group AICRG. Despite his tight schedule, you still find Patrick a person who is reasonable and relatable on helping people with research.






Prof.(Dr.) Patrick Hang Hui Then
Associate Dean Computing, Head of Advance Informatics Consultation and Research Group, Swinburne University of Technology , Australia



Prof. (Dr.) Bebo White
SLAC National Accelerator Laboratory, Stanford University, USA

Bebo White is a Departmental Associate (Emeritus) at the SLAC National Accelerator Laboratory, the U.S. national laboratory for high-energy physics and basic energy science at Stanford University. Working as a computational physicist, he first became involved with the emerging Web technology while on sabbatical at CERN in 1989. He was part of the team that established the first non-European Web site at SLAC (the fifth site in the world). Ever since, his academic research interests have evolved in parallel with Web technology and he has become internationally recognized as a WWW pioneer and visionary. He is considered to be the "first American Webmaster" and one of the founders of the discipline of Web Engineering. In addition to his work at SLAC, he also holds faculty appointments at several other institutions, member of the organizing committees of a number of major conferences series and a frequent conference speaker and paper reviewer. The Association for Computing Machinery (ACM) has selected him to be a part of their Distinguished Speaker Program. He is the author (or co-author) of nine books, and over 100 papers and journal articles.

<p>Bipin C. Desai is presently working as professor in the department of Computer Science & Software Engineering, Concordia University, Montreal, Canada. He is a pioneer of Database Management System and has authored numerous books on the same. He is also the General Chair of IDEAS Database conference. His current research interests are: Application of AI and Intelligent Systems, Applications of Cryptography, Database Systems, Database Engineering and Applications, E-Consumer and E-Commerce, Virtual Library, Web and its application.</p>	 <p>Prof. (Dr.) Bipin C Desai Concordia University, Canada</p>
 <p>Prof. (Dr.) Ruili Wang Massey University (Albany Campus), Auckland, New Zealand</p>	<p>Dr. Ruili Wang is an Associate Professor in the School of Engineering and Advanced Technology at the Massey University (Albany Campus). He teaches in the Institute of Natural and Mathematical Sciences. His expertise is majorly in Speech Processing and Machine Learning. As per Google, he has about 1534 citations, features on 19 h-Indexes and on 36 i10-Indexes.</p>
<p>G.P. Li is a professor at the University of California, Irvine, with appointments in Electrical Engineering and Computer Science, Chemical Engineering and Materials Science, and Biomedical Engineering Department. At UCI, he serves as division director of the California Institute for Telecommunications and Information Technology (Calit2) and director of the Integrated Nanosystems Research Facility in The Henry Samueli School of Engineering. Li holds 18 U.S. patents, 15 patents pending and has published more than 280 research papers involving microelectronic technologies, microwave circuit design, Micro-Electro-Mechanical Systems (MEMS) for communication and biomedical instrumentation applications, and bio-nano-IT technology. Li received an outstanding research contribution award from IBM (1987), two outstanding engineering professor awards from UCI (1997 and 2001), the UCI Innovators Award (2005), best paper award from the ITC International Telemetry Conference (2005), and outstanding Asian American and Pacific Islander Community Leaders and Role Models award by the Asian Business Association of Orange County (2009).</p>	 <p>Prof. (Dr.) G.P. Li Director California Institute of Telecommunications and Information Technology, University of California, USA</p>

<p>Jean-Paul Van Belle is a professor of information technology and director at the Centre for Information Technology and National Development in Africa at the University of Cape Town. He was head of the department of Information Technology at the University of Cape Town from 2008 to 2011. Van Belle has written over 120 published peer reviewed articles in the fields of service-oriented architecture, unified communications within businesses, open source software, mobile computing, and information and communication technologies for development. In 2012 he established the UCT-Samsung Mobile Innovation Lab at the University of Cape Town.</p>	 <p>Prof. (Dr.) Jean-Paul Van Belle Professor & Director of CITANDA, University of Cape Town , South Africa</p>
 <p>Prof. (Dr.) Atty Jocelle Batapa-Sigue Founder and Executive Director BNEFIT, Philippines</p>	<p>Atty. Jocelle Batapa-Sigue was awarded as the IT-BPM Individual Contributor of the Year. Atty. Jocelle is the Chairperson of the Bacolod-Negros Occidental Federation for Information and Communications Technology (BNEFIT), Inc. and VICTOR, an association of the ICT councils of Region VI, VII and VIII and the members of the Regional Development Councils of all the Visayas Regions. In her vast list of achievements, Atty. Jocelle has played an important role in boosting the ICT-BPM Industry in the Philippine countryside by actively promoting the Next Wave Cities (NWC) program started by the then Commission on Information and Communications Technology (CICT), Department of Trade and Industry (DTI) and the Information Technology & Business Processing Association of the Philippines (IBPAP), as having highly encouraged cities outside of Metro Manila and Cebu to improve competitiveness as ICT-enabled industry locations.</p>
<p>Prof. Berg studied mathematics and physics at the TUDelft while being active in the national student movement. In 1977, He received the diploma of Mathematical Engineer. From 1977-1989, He lectured courses in mathematics, physics and computer science on institutes of higher education in Breda and Eindhoven, and mathematics and physics at the secondary school of Nampula, Mozambique. From 1989-2006, He worked at the Econometric Institute of Erasmus University Rotterdam. There, He lectured courses in computer science and economics, and did research in many fields, especially in computational intelligence, with applications in combinatorial optimization, finance, agriculture, philosophy, bibliometrics, among others. From 2006 up till now, He worked at TUDelft again, mostly on topics related to (Big) Data Analytics and/or Cyber Security. In June 2015 He have been appointed as full professor Cyber Security at Leiden University as well.</p>	 <p>Prof. (Dr.) Jan van den Berg Scientific Director, Delft University of Technology, Netherlands</p>



Prof. (Dr.) Sanjeev Baskiyar
Dept. of Computer Science & Software
Engineering, Auburn University,
Auburn, US

Dr. Sanjeev Baskiyar is someone who specialises in the fields of Scheduling, Real-time and Embedded Computing Storage, Computer Architecture, Distributed Computing, STEM education. He has received several competitive national and state-merit scholarships. In his long career, Dr. Baskiyar has experienced working as an Assistant Professor at Western Michigan University, as a Senior Software Engineer in Unisys Corporation, and Computer Engineer in Tata Motors, India. Dr. Baskiyar's research has been supported by grants from the National Science Foundation, DARPA/AFRL, NASA/MSGC, Wind-River Systems and Mentor Graphics. He is currently Associate Professor (with tenure) in the department of Computer Science and Software Engineering at Auburn University.

Dr. Rahman is a Senior Lecturer in Mathematics and Statistics, Charles Sturt University. His area of research mainly lies in Theoretical and applied statistics, small area estimation, Bayesian statistical modeling, micro simulation and biostatistics. Theoretical and applied statistics, small area estimation, Bayesian statistical modeling, micro simulation and biostatistics.



Prof. (Dr.) Azizur Rahman
Charles Sturt University, Australia



Prof. (Dr.) Parma Nand
Auckland University, New Zealand

Dr. Parma Nand's main research area is Artificial Intelligence, particularly in the Natural Language Engineering. His current interest and research projects are based around information extraction from free texts as well as generation of free texts. Other areas of interest in terms of teaching and research are concurrent programming, multi-processor/multi-core programming and computational optimization. Prior to his academic career he has worked as a software engineer for various companies in New Zealand. His main areas of expertise lie in designing software in the retail oil and electronic funds transfer industry. He has extensive experience in writing optimized applications using assembly and C languages for limited-memory embedded operating systems. He has also worked on client-server architecture systems in the electronic funds transfer industry.



Prof. (Dr.) Rosario M. Piro
Freie University of Berlin

Rosario M. Piro is a PhD in molecular medicine with focus on bioinformatics at the Molecular Biotechnology Center and the Department of Genetics, Biology and Biochemistry of the University of Torino. Graduate studies (Master's degree) in bioinformatics at University of Torino. His interested field of Study includes Prioritization of candidate genes for human hereditary diseases. Graduate studies (LaureaSpecialistica) in physics at the University of Torino and the Italian National Institute of Nuclear Physics - Section of Torino (INFN Torino), Grid computing in high energy physics; Economic Models for the Distributed Grid Accounting System (DGAS) of the European Data Grid (EDG).

Dr. Siti Norul Huda Sheikh Abdullah is a pioneer of innovation, and possesses a vast depository of knowledge. She has the experience of working in some of the foremost fields, including stints in the Machine Vision Lab, being a part of the Pattern Recognition Research Group and having close ties with the Center for Artificial Intelligence. Her specialty is Pattern Recognition, Computer Vision, and Machine Learning. In her long and distinguished career, she has around 585 Google citations,


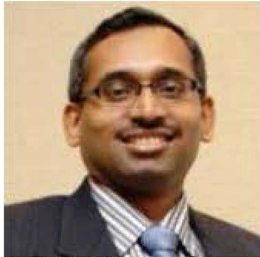



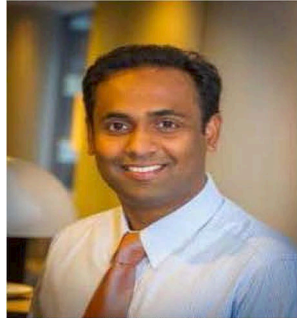
Prof. (Dr.) Siti Norul Huda Sheikh Abdullah
Faculty Technology & Science Management,
National University of Malaysia



Prof. (Dr.) Simeon Simoff
Dean (School of Computing,
Engineering & Mathematics),
University of Western Sydney,
AUSTRALIA

Professor Simeon Simoff is currently the Dean of the School of Computing, Engineering and Mathematics at the Western Sydney University. Simeon was previously a Professor of Information Technology at the University of Technology, Sydney. Prior to UTS he held academic positions at the University of Sydney, the Middle East Technical University, University of Nantes and Istanbul Technical University. In 2006 he was a BIT Professor at the Free University of Bolzano-Bozen and the University of Trento. He is a founding Director and a Fellow of the Institute of Analytics Professionals of Australia. Currently he is an editor of the ACS Conferences in Research and Practice in Information Technology (CRPIT) series in Computer Science and ICT. Prior to that he was the associate editor (Australia) of the American Society of Civil Engineering (ASCE) Journal of Computing in Civil Engineering. Currently he serves on the ASCE Technical Committees on Data and Information Management, and on Intelligent Computing.

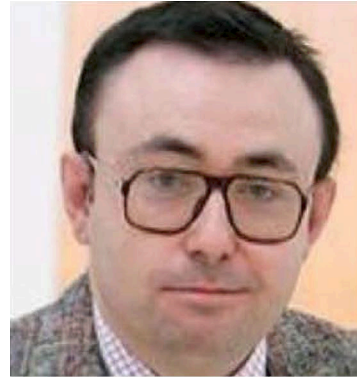
<p>Dr. Faisal Khan is a Professor and the Vale Research Chair of Process Safety and Risk Engineering. In 2000, He founded the Safety and Risk Engineering Group (SREG) at Memorial University of Newfoundland which currently has 40+ team members including academics, research engineers, and graduate students who are doing research on a wide range of theoretical and applied research activities mainly related to process safety and asset integrity management. Dr. Khan's areas of research interest include: safety and risk engineering, inherent safety, risk management, and risk-based integrity assessment and management</p>	 <p>Prof. (Dr.) Faisal Khan Memorial University, Canada</p>
 <p>Prof. (Dr.) R. Logeswaran Dean of Postgraduate Studies, Asia Pacific University, Malaysia</p>	<p>Prof. Dr. R. Logeswaran completed his B.Eng. (Hons) Computing from the University of London (Imperial College), United Kingdom in the year 1997. He completed his M.Eng. Sc., from the Multimedia University, Malaysia in the year 2000. As a part of the Asia Pacific University, Prof. R Logeswaran is a Chairman of the New Programs Development Committee (Faculty of Computing, Engineering & Technology) and also the Chairman of the Postgraduate and Research Committee. He's a senior member of IEEE Signal Processing Society (Malaysia chapter) (SMIEEE), Hon. Secretary of the Institution of Engineers (IE), Malaysia (IEM), Graduate Member, Board of Engineers Malaysia (BEM), Graduate Engineer AFEO Governing Body, Associate ASEAN Engineer (AAE 2975) and the City and Guilds Institutions UK, Associate (ACGI).</p>
<p>Professor Keshav Dahal joined the University of the West Scotland in 2013 as a research lead of the Artificial Intelligence, Visual Communication and Networks (AVCN) research centre. His research interests lie in the areas of Computational intelligence, Machine learning, Big data mining, Scheduling/Optimisation, Trust/security modeling in cloud and distributed systems, and diagnosis/remote healthcare systems. His research paper on 'reputation/trust modelling' won the Best Paper award at an IEEE Conference. He has been principal/co-investigator of 15 EU/UK/Industry funded projects worth over £4 million in last ten years. Currently, he is coordinating a consortium of 20 partners for EU Erasmus Mundus Action 2 'SmartLink' project (2014-2018). Prof. Dahal has published over 100 peer-reviewed journals/conferences papers and 3 edited books. He is a senior member of the IEEE and fellow of the Higher Education Academy (HEA).</p>	 <p>Prof. (Dr.) Keshav Dahal University of the West of Scotland, Scotland</p>



Prof. (Dr.) Robin Doss
Deputy Head School of Information
Technology, Deakin University, Australia

Dr. Doss joined the School of Information Technology, Deakin University, Australia, in 2003 and is currently the Associate Head of School (Development & International). His current research is focused on information gathering in wireless sensor networks, defence against distributed denial of service (DDoS) attacks in the Internet, system recovery in mission critical wireless networks and secure and efficient communication in near field communication (NFC) systems. He was part of the team of researchers funded through the Research Support for Counter Terrorism (RSCT) initiative of the Australian government to provide advice to the department of Prime Minister and Cabinet. His research interests are in the broad areas of communication systems, protocol design, wireless networks, security and privacy.

Prof. Diego Galar has a M.Sc. in Tele communications, PhD degree in Manufacturing from the University of Saragossa and PhD in BA from Mexico V. University. In industry, he has been technological director and CBM manager. He has authored more than hundred journal and conference papers, books and technical reports in the field of maintenance. Currently, he is full professor in the Division of Operation and Maintenance in LTU, Lulea University of Technology, where he is coordinating several EU-FP7 projects related to different maintenance aspects and is also involved in the SKF UTC centre located in Lulea focused in SMART bearings.






Prof. (Dr.) Diego Galar
Luleå University of Technology, Sweden



Prof. (Dr.) Adheesh Budree
University of Cape Town, South Africa

Dr. Budree is a PhD. From University of Western Cape. He had also done M.Sc in Financial economics from University of London. His research interests are Disruptive innovation, ICTs and Development and e-Commerce. He is a supporter and firm believer of Economics in Technology.

<p>Ajith Abraham received the Ph.D. degree in Computer Science from Monash University, Melbourne, Australia. He is currently coordinating the efforts of Machine Intelligence Research Labs (MIR Labs), Scientific Network for Innovation and Research Excellence, USA, which has members from more than 75 countries. He works in a multi-disciplinary environment involving machine intelligence, various aspects of networks, web intelligence, information security, computational grids, data mining and their applications to various real-world problems. He has given more than 50 plenary lectures and conference tutorials in these areas. Dr. Ajith is the Chair of IEEE Systems Man and Cybernetics Society, Technical Committee on Soft Computing.</p>	 <p>Prof. (Dr.) Ajith Abraham Director, Machine Intelligence Research Lab, USA</p>
 <p>Prof. (Dr.) Suzanne Kieffer Assistant Professor, Vrije Universiteit Brussel, Belgium</p>	<p>Dr. Suzanne Kieffer is Assistant Professor at Vrije Universiteit Brussel and Research Associate at Université catholique de Louvain, Belgium. She holds a PhD in Computer Science from Henri Poincaré University, France. Suzanne has been working for and with users for over 10 years. Passionate about UX, she provides consultancy services to help software organizations define and successfully implement UX strategy plans. She especially enjoys raising to the challenge in agile development settings.</p>
<p>Dr. Miraslow Staron has research interest in software Engineering and software metrics. He loves teaching empirical research and Industrial collaboration.</p>	 <p>Prof. (Dr.) Miraslow Staron Head of Division at Software Engineering, Chalmers University of Gottingburg, Sweden</p>



Prof. (Dr.) Teo Yong Meng
National University of Singapore, Singapore

Dr. TEO Yong Meng is an Associate Professor of Computer Science at the National University of Singapore. He leads the Computer Systems Group and the Information Technology Unit. He is also a Visiting Professor at Shanghai Advanced Research Institute, Chinese Academy of Sciences. Since 2008, he serves as external grant evaluator for the European Research Council's Ideas Specific Programme. He was a Fellow of the Singapore-Massachusetts Institute of Technology Alliance from 2002-2006. Yong Meng received his B.Tech (1st Class Hons) in Computer Science from the University of Bradford in UK, and his Master and PhD in Computer Science from the University of Manchester, UK, in 1987 and 1989. His main research interest is in parallel and distributed computing. Current projects include performance analysis of large systems, distributed (cloud) resource pricing, theory of parallelism, and semantic validation of component-based models.

Prof. (Dr.) Manuel A. Uy is the Dean of the Institute of Information Technology Carlos Hilado Memorial State College in Bacod city, Philippines. He is a member of Alijis, Bacod City campus of the Carlos Hilado Memorial State College (CHMSC). He has worked on the Blended Learning Project as its Vice-Chairman at CPSC and was accompanied by four other professors.

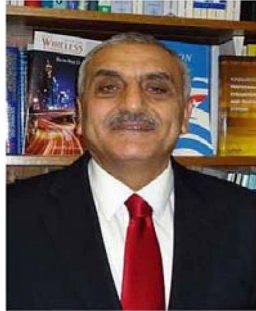


Prof. (Dr.) Manuel A. Uy
Dean, Institute of Information Technology, Carlos Hilado Memorial State College, Bacod City, Philippines



Prof. (Dr.) Ethel Schuster
Northern Essex Community College,
London

Dr. Ethel Schuster is still teaching classes in the field of computer and information science from applications to programming to security and web design. Schuster worked as a computer programmer for two years after graduating from Brandeis University with a bachelor's in computer science. After that, she went on to earn both a master's and PhD in computer and information science from the University of Pennsylvania. Schuster comes to CIS via computational linguistics, which was the focus of her graduate work.



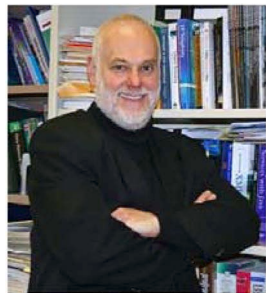
Prof. (Dr.) Mohammad S. Obaidat
Chair Department of Computer and
Information Science, Fordham
University, USA.

Mohammad Salameh Obaidat is a computer science/engineering academic and scholar, President and a Fellow of the Society for Modeling and Simulation International (SCS), and a Fellow of the Institute of Electrical and Electronics Engineers (IEEE). Obaidat is the Chair and Professor of the Department of Computer and Information Science at Fordham University, NY, USA. He was born in Jordan and received his M.S. and Ph.D. in computer engineering from the Ohio State University. He served as IEEE Computer Society Distinguished lecturer/visitor (1994-1997) and now is a distinguished lecturer for the Association for Computing Machinery (ACM) and SCS. His research interests encompass wireless systems, computer communication networking, cyber security, Learning Automata, Neural Networks, Parallel and Distributed Systems, Modeling and Simulation, Performance Evaluation of Computer and Telecommunication Systems, among others.

Chuchi Sumalpong Montenegro is presently Chairperson in Computer Science Department in Silliman University, Philippines. Teaching is her major interest, but if given the chance, she would love to fly and try on some extreme sports. Prof. Chuchi Sumalpong-Montenegro is the Chairperson of the Computer Science Department of the College of Computer Studies. She has been working in the University for 13 years starting off as an Instructor back in 1995.





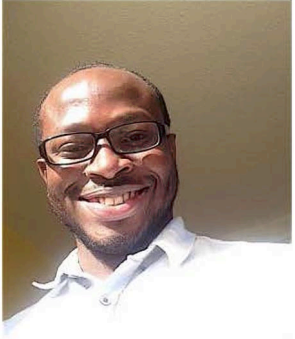
Prof. (Dr.) Chuchi Sumalpong Montenegro
Chairperson Computer Science Department,
Silliman University, Philippines



Prof. (Dr.) Haim Levkowitz
Chair, Computer Science Department,
University of Massachusetts, Lowell

Haim Levkowitz is the Chair of the Computer Science Department at the University of Massachusetts Lowell, where he has been a Faculty member since 1989. He was a twice recipient of a US Fulbright Scholar Award to Brazil (2012 and 2004-2005). He co-founded (1991) and was Co-Director of the Institute for Visualization and Perception Research (through 2012), and is now Director of the Human-Information Interaction Research Group. He is a world renowned authority on visualization, perception, color, and their application in data mining and information retrieval. His research interests lie at the intersection of humans' interaction with their ever-growing amount of information.

<p>Dr. Dave E. Marcial, a professor at the College of Computer Studies, obtained his undergraduate degree in Computer Science at the Holy Name University in Bohol in 1999. He finished his master's in computer science from the University of Negros Occidental-Recoletos in Cebu and then obtained his Doctor of Philosophy in Education from the University. He has served as Dean of the College of Computer Studies.</p>	 <p>Dr. Dave E. Marcial OIC Dean, Uytensu Computer Studies Hall, Silliman University, Philippines.</p>
 <p>Prof. (Dr.) Dennis Peters Head of Department of Electrical and Computer Engineering, Memorial University of Newfoundland, Canada</p>	<p>Dr. Dennis Peters is an Associate Professor and Head of Electrical and Computer Engineering where he has been a member of Faculty since 1998. His research involves techniques for design and verification of software and computer systems, with particular focus on high performance computing, real-time applications and parallel or distributed processing. He is the Chair of the Board of Directors of the Professional Engineers and Geoscientists of Newfoundland and Labrador (PEGNL). His teaching activity is primarily in the area of software, ranging from introductory programming courses to advanced topics such as real-time operating systems and concurrent programming.</p>
<p>Jinghua Nie, the faculty's international officer, has been awarded the School of Graduate Studies' (SGS) Dean's Award for Service Excellence. Dr. Leonard Lye, the faculty's associate dean of Graduate Studies, nominated Ms. Nie for this service award and is thrilled that she was chosen. A recent graduate of the program, Weiyun Lin, is grateful for Ms. Nie's dedication and attention to details.</p>	 <p>Ms. Jinhua Nie Manager of International Programs, Memorial University of Newfoundland, Canada</p>

 <p>Prof. (Dr.) Robert Roxas Department Chair, University of the Cebu, Philippines</p>	<p>Robert R. Roxas holds the degree PhD in Computer Science and Engineering, which he obtained from the University of Aizu in Japan in September 2004. He has been teaching in the academe since November of 1996. Currently, he is the Department Chair of the Department of Computer Science of the University of the Philippines Cebu. His research interests include Cyber-filmification, Natural Language Processing, and Music Notation Software.</p>
<p>Prof. Dr. Triantafyllos (Aldo) Kanakis joined the University of Northampton, Department of Computing, in 2014 as a lecturer in computer networks. He is a Senior Lecturer at University of Northampton. He holds a B.Eng. (Hons.) in Communication Systems Engineering from the University of Portsmouth, an M.Sc. in Mobile and Personal Communications from King's College London and a PhD in Wireless and Mobile Communications from the University of Greenwich. He has tens of scientific and technical publications in international journals and conferences.</p>	 <p>Prof. (Dr.) Triantafyllos (Aldo) Kanakis, University of Northampton, UK.</p>
 <p>Prof. (Dr.) Michael Opoku Agyeman University of Northampton, UK</p>	<p>Michael Opoku Agyeman is a lecturer at the Department of Computing and Immersive Technologies. Previously, he was with the Intel Embedded System Research group of The Chinese University of Hong Kong as a Research Associate. He received the PhD. from the Department of Computing at Glasgow Caledonian University, Glasgow, in 2014 and the MSc. degree in Embedded and Distributed Systems from London South Bank University, London, in 2009. He received the BSc. (Hons.) in electrical and electronics engineering from Kwame Nkrumah University of Science and Technology (KNUST), Ghana, in 2008. Michael's research interests include VLSI SoC design, reconfigurable computing, wired and wireless NoCs, computer architecture and operating systems.</p>

<p>Jeanette Smith-Perrone is a professor/program chair in the Networking and Cyber Security Department at the Tacoma Community College, USA. Her credentials include BSIT, MBA and CISSP. She has a record of over 35 years of outstanding proven success in the leadership, strategic planning, project management, project implementation and support of corporate operations for fast-paced logistics, legal, health care, education, retail, utility, food product, grocery, graphic design, manufacturing, distribution, non-profit and government organizations.</p>	 <p>Prof. (Dr.) Jeanette Smith-Perrone Tacoma Community College, USA.</p>
 <p>Prof. (Dr.) Vijay K Arora Professor, IEEE- EDS Distinguished Lecturer</p>	<p>Vijay K. Arora is the recipient of the Brain Gain fellowship of the Academy of Sciences Malaysia (ASM). His research interests include mobility limiting mechanisms in high-speed devices, including quantum and high-field effects. He is listed in Greatest Geniuses of the 21st Century, Leading Educators of the World 2005, Leading Scientists of the World 2005. He has also held distinguished visiting appointments at the University of Illinois, the University of Tokyo, National University of Singapore and the University of Western Australia.</p>
<p>Dr. Virendrakumar C. Bhavsar is an Honorary Research Professor, the founding Director of the Advanced Computational Laboratory, and former Professor as well as Dean of the Faculty of Computer Science at the University of New Brunswick. He is President of the SAI Super and Intelligent Computer Systems, Inc., Fredericton. He has published more than 160 research papers in journals & conference proceedings. He co-led the bioinformatics component of the Canadian Potato Genomics project. Recently, he led the Province of New Brunswick component of the Atlantic Computational Excellence Network (ACEnet) – a \$30+ million high performance computing initiative in Atlantic Canada. Current areas of research include intelligent systems with applications in e-Business and e-Learning, semantic search and semantic matchmaking, natural language processing and deep learning.</p>	 <p>Dr. Virendrakumar C. Bhavsar Honorary Research Professor, University of New Brunswick, Canada</p>

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