

# 15-16 April 2013 Gaza, Gaza Strip, Palestine







### APRIL 15 - 16, 2013 FACULTY OF INFORMATION TECHNOLOGY ISLAMIC UNIVERSITY OF GAZA, GAZA, PALESTINE fit.iugaza.edu.ps/picict





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سنام القدس منه المدرس ممتود

# **Proceedings of the**

# **2013** Palestinian International Conference on Information and Communication Technology

15-16 April, 2013, Gaza, Gaza Strip, Palestine



## PICICT 2013 General Chair's Message

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Welcome to the 2013 Palestinian International Conference on Information and Communication Technology (PICICT 2013). It aims to bring together researchers, scientists, engineers, and practitioners to exchange and share their experiences, new ideas, developments, applications and research results on different aspects of Information and communication Technology. This conference would give the opportunity for the participants to discuss the practical challenges they encounter in there scientific research and the solutions they adapted. We have accepted high standard papers and have distinguished keynote speakers.

Many individuals have contributed to the success of the conference. My sincere appreciation goes to all authors including those whose papers were not included in the program. Many thanks to our distinguished keynote speakers for their valuable contribution to the conference.

Special thanks to the organizing committee chair, Dr. Rebhi S. Baraka for leading the organizing efforts. Thanks also to the reviewing committee chair Prof. Dr. Nabil M. Hewahi and the reviewers for their timely work and efforts. Thanks also to Dr. Adel Khelifi for his continued efforts and support in the organizing committee.

I also would like to thank supporters and sponsors of the conference.

Finally I wish you a good time participating in the conference.

Dr. Tawfiq S. Barhoom General Chair of PICICT 2013 Dean Faculty of Information Technology Islamic University of Gaza http://site.iugaza.edu.ps/tbarhoom

## PICICT 2013 Organizing Committee Chair's Message

![](_page_4_Picture_1.jpeg)

On behalf of the organizing committee, I am very pleased to welcome all participants to the 2013 Palestinian International Conference on Information and Communication Technology (PICICT 2013). The organizing committee consists of members and experts from different countries and universities. The conference main track consist of keynotes and high-quality scientific papers presentations. Additionally, we organized two other events, namely: the Information Technology Exhibition and the Graduation Projects Exhibition. The program for the conference was organized as a single track to allow participants to attend as many presentations as possible.

We are grateful to the volunteering work of our colleagues of the organizing, the Scientific, the reviewing and the technical committees.

We acknowledge the financial support and the sponsorship from the Ministry of Telecommunication and Information Technology, the Ministry of Education and Higher Education, the Palestinian IT Association of companies (PITA), Alkitab TV Channel, Alquds TV Channel, and Felesteen Newspaper.

We wish you all the best during the conference and during your stay in Gaza.

Dr. Rebhi S. Baraka Organizing Committee Chair of PICICT 2013 Vice Dean Faculty of Information Technology Islamic University of Gaza http://site.iugaza.edu.ps/rbaraka

![](_page_4_Picture_7.jpeg)

### Committees

#### Organizing Committee

Dr. Tawfiq Barhoom, General Chair, Dean Faculty of IT, Islamic University of Gaza, Palestine.

**Dr. Rebhi Baraka**, Head of the Organizing Committee, Faculty of IT, Islamic University of Gaza, Palestine. **Prof. Dr. Nabil Hewahi**, Head of the Scientific Committee, College of IT, Bahrain University, Bahrain.

Dr. Adel Khelifi, Dean of Research and Graduate Studies, ALHOSN University, UAE.

Dr. Hamed Alfoara, Faculty of Science and Information Technology, Zarqa University, Jordan.

Dr. Manar Abu Talib, Zayed University, UAE.

**Dr. Zaigham Mahmood**, Asst. Head, DISYS (Distributed & Intelligent Systems) Research Group, University of Derby, UK.

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Dr. Yousef Abu Zer, Al-Quds Open University, West Bank, Palestine.

Dr. Nikolaj Popov, Research Institute of Symbolic Computation, Johannes Kepler University, Austria.

Dr. Raed Salha, Public Relations, Islamic University of Gaza, Palestine.

Eng. Ehab Mortaja, Faculty of IT, Islamic University of Gaza, Palestine.

#### **Technical Committee**

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Mr. Arafat Abu-jrai, Faculty of IT, Islamic University of Gaza, Palestine.

Mr. Khaled Jaber, Faculty of IT, Islamic University of Gaza, Palestine.

Mr. Raed Rasheed, Faculty of IT, Islamic University of Gaza, Palestine.

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## Distinguished Keynote Speakers

## Keynote Speech 1: IT-Science Based Economy:

(Case Study JKU Softwarepark in Austria).

**Prof. Dr. Bruno Buchberger**, Johannes Kepler University in Linz, Austria. Monday, April 15. 09:40 – 10:40.

![](_page_7_Picture_4.jpeg)

The JKU Softwarepark is a spin-off of the Johannes Kepler Univesity (JKU), Linz, Austria. It was founded and built up by the speaker in a rural region outside Linz on the request of the Upper-Austrian Government to "develop economy in this underprivileged region of Austria". Starting from the speaker's Research Institute for Symbolic Computation (RISC) of the JKU with which he moved to this region with no more than 25 researchers and PhD students, there are now 1000 R&D people working and 1500 students studying in the Softwarepark. The Softwarepark Hagenberg was the first softwarepark (i.e. technology park exclusively devoted to software) world-wide and, recently, initiated the "Global Network of Softwareparks" and a special "Go

Global" Program for its members. In this talk, we will explain a few fundamental strategic principles which we developed, tried out and followed for building up innovative and future-oriented economy from an academic institution and which proved useful in building up the JKU Softwarepark:

- "The highest first": Start from basic research and a PhD program even if, ultimately, you want to generate industry, attract companies, create working places, stimulate start-ups. If you manage to build up basic research and a doctoral studies, all other layers of research, education, and industrial application can be built up relatively easily and quickly and you earn the respect and attention of the international community.
- "The magic triangle": Try to have research, academic education and business "under one roof". Research, academic education, and business form the three pillars of innovation and, together, generate synergetic growth and, finally, economic welfare.
- Global networking versus regional focus: It is very important to pursue international networking and, at the same time, pay attention to one's own region. Having strong international ties in a global network of technology centers generates a win-win situation for all members of the network and opens up numerous opportunities for the researchers, teachers, students, companies, employees of the network members. On the other hand, regional focus is equally important. A global world can develop an exciting future only if the regional peculiarities, traditions, historic insights, and unique cultural contributions are developed and cultivated.
- Academic excellence versus entrepreneurial spirit and risk capital: For a technology center to grow, it is very
  important to unify seemingly opposing views and attitudes like the standards, views, and foci of academia,
  the spontaneity and entrepreneurial spirit of young start-up companies and the business, risk and profit
  mentality of investors.
- Academic excellence versus life style: Scientific, technical, and economic excellence alone, nowadays, is not sufficient for creating a top technology center. Rather, technology centers must try to be a testbed for future vibrating juvenescent lifestyles, new societal opportunities and a new understanding of living in harmony with nature.
- Academic freedom versus societal responsibility: Traditionally, academia needs intellectual freedom for achieving excellence and innovation at international level. However, at the same time, academic institutions have a high responsibility for the growth, welfare, and development of the regions in which they are situated. Therefore, academic institutions must set a model for responsible thinking and acting for their students and prepare them for leadership in society.

- Cooperation between academia, economy, and government: Technology centers can only grow if academia, economy, and government cooperate intensively and flexibly.
- The particular role of IT: IT today is an essential ingredient into basically all areas of science and technology and all aspects of society and, in particular, economy. Therefore, it is a good idea to start the innovation chain from academia to economy in a region with a strong focus on IT.

#### Short Bio:

Buchberger is Professor of Computer Mathematics at the Research Institute for Symbolic Computation (RISC) of the Johannes Kepler University in Linz, Austria. Buchberger is best known for the invention of the theory of Groebner bases, which has found numerous applications in mathematics, science, and engineering. For his Groebner bases theory, he received the prestigious ACM Kanellakis Award 2007, see http://awards.acm.org/kanellakis/, he was elected (1991) member of the Academia Europea (London) and received five honorary doctorates. His current main research topic is automated mathematical theory exploration (the "Theorema Project"). This project aims at the (semi-)automation of the mathematical invention and verification process, see www.theorema.org.

Bruno Buchberger initiated and built up the Softwarepark Hagenberg starting in 1987 from his research institute RISC (Research Institute for Symbolic Computation) of the Johannes Kepler University in Linz, Austria. From an initial group of 25 international researchers and PhD students, in the meantime, the Softwarepark grew to currently 2500 people (1000 R&D co-workers in 12 research institutes and 60 companies and 1500 students in computer science on the postdoc, PhD, master and bachelor level) with a total infrastructure investment of approx. 150 mio Euro. The secondary effects of the work of the Softwarepark on the regional and national economy was recently estimated to be six times as high as the infrastructure investment.

By building up the Softwarepark Hagenberg, Buchberger wanted and wants to demonstrate the innovative power contained in basic research in computer mathematics and software science (the areas in which RISC plays a leading role in the world). From a solid foundation in basic research, by opening the mind of academia to the practical needs of industry, small and medium enterprises, and society one can build up efficiently and quickly all the intermediate levels of the innovation chain (applied research, software development, start-up companies, high-level research education in international postdoc and PhD programs, high-quality practical education on the master and bachelor level, life-long training etc).

Research, high-quality education, and entrepreneural spirit must come together with sustainable investment and risk capital. The close interaction of academica, economy, and government is crucial for the success of such endeavors as the Softwarepark Hagenberg. The Softwarepark Hagenberg was the first technology park in the world specializing in software-. By now, approximately, 50 other softwareparks evolved throughout the world.

This year, Oct 10-12, 2012, the Softwarepark Hagenberg proudly invites the other Softwareparks from all over the world to the "1st International Meeting of Softwareparks" with the goal of establishing a worldwide network of Softwareparks that will support the global promotion of our start-up companies. With his unique experience of turning successful research into economic growth and societal progress, Professor Buchberger is a sought-after keynote speaker at conferences and consultant of governmental and industrial organizations.

#### Keynote Speech 2: Data protection (Cryptography, Watermarking, steganography).

**Prof. Dr. Habib Hamam,** Université de Moncton, Canada. Tuesday, April 16. 09:00 – 10:00.

![](_page_9_Picture_2.jpeg)

Because private, confidential and secret data are more and more abundant in modern society and because malicious hackers and intruders are using more and more sophisticated methods and technologies, developing powerful data protection becomes an urgent need. Presently, three main methods are being used: cryptography, watermarking, and steganography. Encryption techniques (cryptography) consists in making the signal (text, speech, image, ...) look garbled to unauthorized people. Watermarking consists in hiding data (also called object, signal or signature) in a cover medium (also called cover or host signal) to convey information about the cover signal itself such as ownership and copyright. The hidden signature could be visible or

invisible. In contrast to cryptography, steganography (from Greek: covering or hiding) consists in secret communication by hiding signal (secret) in another signal (public or intentionally wrong signal) to avoid suspicion. This quality is referred to as imperceptibility and is correlated with the amount of data to hide. To enhance protection of data, if the intruder, by accident or by any sophisticated tool, realizes the presence of hidden data and is able to separate hidden and cover signals, he or she should not be able to exploit what he/she found. Thus, it is worth encrypting data before hiding them inside the cover signal.

An overview on encryption methods (data security) and on watermarking and steganography (data hiding) will be given, with a focus on the less known and most recent discipline, namely steganography. Techniques, limitations and future trends will be presented. A new method based on representation of data by combinations will be also presented.

#### Short Bio:

Hamam obtained the B.Eng. and M.Sc. degrees in information processing from the Technical University of Munich, Germany 1988 and 1992, and the PhD degree in Physics and applications in telecommunications from Universite de Rennes I conjointly with France Telecom Graduate School, France 1995. He also obtained a postdoctoral diploma, "Accreditation to Supervise Research in Signal Processing and Telecommunications", from Universite de Rennes I in 2004. He is currently a full Professor in the Department of Electrical Engineering at the Universite de Moncton and a Canada Research Chair holder in "Optics in Information and Communication Technologies". He is an IEEE senior member and a registered professional engineer in New-Brunswick. He is among others associate editor of the IEEE Canadian Review, member of the editorial boards of Wireless Communications - Hindawi Publishing Corporation. His research interests are in optical telecommunications, Wireless Communications, diffraction, fiber components, RFID, Human-Machine interaction and E-Learning.

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## Seminar Talks

#### Pre-conference Seminar Talk: ABET Accreditation.

**Dr. Adel Khelifi**, Dean of Research and Graduate Studies, ALHOSN University, UAE. Saturday, April 13. 12:00 – 13:30.

![](_page_10_Picture_3.jpeg)

ABET stands for Accreditation Board for Engineering and Technology, Inc. It is a non-governmental organization, in USA, that accredits post-secondary education programs in applied science, computing, engineering, and engineering technology. It is amongst the most respected accreditation organizations in the U.S and worldwide with more than 75 Years of Quality Assurance in Education. It is perhaps currently the bestdeveloped and most well respected system for the accreditation of engineering education in the world.

This accreditation assures that a program has met international quality standards set by the profession. It is an important indicator of a program's

commitment to quality and a key to professionals' future. In USA, to become a licensed professional engineer, one common prerequisite is graduation from an ABET-accredited program. ABET is the recognized U.S. accreditor of college and university programs in applied science, computing, engineering, and technology. http://www.abet.org/home/.

# Post-conference Seminar Talk: The Future of Mathematics: A Personal View (Mathematics as the Central Thinking Technology of 21<sup>st</sup> Century).

**Prof. Dr. Bruno Buchberger**, Johannes Kepler University in Linz, Austria. Wednesday, April 17. 12:00 – 13:30.

![](_page_10_Picture_9.jpeg)

Mathematics is the art of gaining knowledge and solving problems by reasoning. The art of reasoning has been cultivated over the centuries and reached an impressive peak in the 20<sup>th</sup> century:

- Reasoning can be formulated in terms of rules that are so simple that everybody has the chance to check whether or not a sequence of reasoning steps is correct or not. In addition, the collection of these rules is complete in the sense that the entire building of mathematical knowledge can be derived from simple principles by these rules.

- As a special case, these rules contain equational logic, which can be seen as the prototype of a universal computer or, in other words, algorithmics.

All of modern science and technology is based on mathematics in its current, fully fledged form. And modern society, to a great extent, is based on science and technology. Thus, mathematics is in the center of the creativity spiral ("the innovation chain") that goes from science via technology via economy to societal welfare.

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In 21<sup>st</sup> century, the dynamics of mathematics gains speed, energy, and sophistication by the application of mathematics to itself: The invention and verification process of mathematics itself is more and more understood as a process that can be supported by mathematical algorithms with revolutionary consequences for research, education, and application of mathematics.

In the talk, we will clarify the creative mechanics of self-application of mathematics and derive some consequences (as our personal subjective view) for the nature and role of mathematics in 21<sup>st</sup> century:

- The goal, content and style of future mathematics will focus on automation of the mathematical invention process.
- Logic, mathematics, and computer science will be seen as one unified amalgamation, which we call "thinking technology".
- Automated reasoning will lead to a new kind of central global mathematical knowledge basis for all sciences that will evolve dynamically by automated reasoning and the contribution of individual mathematicians over the global net.
- The functionality of mathematical journals will change dramatically.
- Mathematical education using technology will play a particularly important role in providing math education for the masses. A careful analysis of how to use technology for math education is necessary for achieving this goal.
- On the other hand, the role of precision of human mathematical thinking and speaking and the role of personal teachers will increase.
- The speed and reliability of generating mathematical knowledge and developing applications based on algorithmic mathematics will increase drastically.

In the last part of the talk, we will discuss some recent research results of the speaker in the area of automated algorithm synthesis that illustrate the future potential of automated reasoning.

Finally, as a counterpoint to the intellectual sophistication of current mathematics, we will comment on the principal limitation of the mathematical approach to individual and societal happiness and will identify harmony with nature in silence as the other, orthogonal, key factor for future human prosperity.

## Tutorials

#### Tutorial 1: Mobile Applications

**Dr. Adel Khelifi**, Dean of Research and Graduate Studies, ALHOSN University, UAE. Monday, April 15. 14:50 – 15:50.

![](_page_12_Picture_3.jpeg)

These days, applications are going increasingly mobile. Software are no longer limited to mainframe, desktops and laptops but instead they more are developed for mobile devices. Android applications capture majority share of international Smartphone Market. According to John Koetsier "Of those 700 million-plus smartphones, 68.4% smartphones ran Android as the operating system, while only 19.4 percent ran iOS, Apple's mobile operating system".

This tutorial teaches students how to build mobile apps for Android and how to deploy them in their handheld devices. Students learn how to write native apps for Android using Eclipse and the Android SDK.

#### Tutorial 2: RFID Technology: Principles, Applications, Limitations and Future Trends

**Prof. Dr. Habib Hamam,** Université de Moncton, Canada. Tuesday, April 16. 15:00 – 16:00.

![](_page_12_Picture_8.jpeg)

#### Background knowledge expected of the participants

No background knowledge is required of the participants as a primer on RFID technology will be presented in the tutorial.

A presentation of RFID: Radio frequency identification (RFID) has been considered as "one of the most pervasive computing technologies in history" (Roberts, 2006 p. 56). However, RFID concept is not new. It is a wireless Automatic Identification and Data Capture (AIDC) that uses radio waves to identify "tagged" product without human intervention. RFID adoption is moving from niches applications such as antitheft

systems, luggage tracking systems in airports, electronic toll collection systems (Smith and Konsynki, 2003), mobile commerce (Fosso Wamba et al., 2007) to more broader applications such as warehouse and supply chain optimization (Lefebvre et al., 2006).

#### Objectives

The main objective of the tutorial is to introduce RFID and present typical applications, its limitations and future trends. Moreover, we are going to discuss some challenges and problems which can arise during a RFID technology implementation.

![](_page_12_Picture_15.jpeg)

## Program at a Glance

Saturday April 13, 2013			
12:00 - 13:30	Pre-conference Seminar Talk		
	ABET Accreditation.		
Monday April 1	.5, 2013		
09:00 - 09:20	Opening Session.		
09:20 - 09:40	Keynote Speech 1 (Prof. Dr. Bruno Buchberger).		
09:40 - 10:40	Short Break.		
10:40 – 11:10	Session 1: E-Learning.		
11:10 – 12:30	Break.		
13:30 – 14:50	Session 2: Ubiquitous Computing.		
14:50 – 15:50	Tutorial 1: Mobile Applications.		
<b>Tuesday April 1</b>	.6, 2013		
09:00 - 10:00	Keynote Speech 2 (Prof. Dr. Habib Hamam).		
10:00 – 11:00	Session 1: AI and Data Mining.		
11:00 - 11:20	Short Break.		
11:20 – 12:40	Session 2: Networking and Information Security.		
12:40 - 13:40	Break.		
13:40 – 15:00	Session 3: E-Business Application.		
15:00 - 16:00	Tutorial 2: RFID Technology: Principles, Applications,		
	Limitations and Future Trends.		
18:30 – 21:00	Closing Session.		
Wednesday April 17, 2013			
12:00 - 13:30	Post-conference Seminar Talk		
	The Future of Mathematics: A Personal View.		

![](_page_13_Figure_2.jpeg)

#### List of Reviewers

Prof. Dr. Nabil Hewahi, Head of the Scientific Committee, College of IT, Bahrain University, Bahrain.

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- Dr. Wael Mustafa, Al Najeh University, Palestine.
- Dr. Nabil M. Hasasneh, Hebron University, Palestine.
- Dr. Adel Khelifi, ALHOSN University, UAE.
- Dr. Saad Biaz, Auborn University, USA.
- Dr. Yousef Al-Haraath, Bahrain University, Bahrain.
- Dr. Iyad T. Abu Doush, Yarmouk University, Jordan.
- Dr. Mohamed Ben Ali, the National School of Engineers of Bizerte, Tunisia.
- Dr. Manar Abu Talib, Zayed University, UAE.
- Dr. Reem Mohamed Reda Bahgat, Cairo University, Egypt.
- Dr. Osama Halabi, Qatar University, Qatar.
- Dr. Khaled Day, Sultan Qabus University, Oman.
- Dr. Nasser Assem, Al Akhaween University, Morocco.
- Dr. Zaigham Mahmood, University of Derby, UK.
- Dr. Jihene Kaabi Harrath, University of Bahrain, Bahrain.
- Dr. Saeed Salem, North Dakota State University, USA.
- Dr. Driss Aboutajdine, Université Mohammed V, Agdal, Rabat, Morocco.
- Dr. Mayada Faisal, Bahrain University, Bahrain.
- Dr. Laila Cheikhi, Université Mohammed V, Souissi, Rabat, Morocco.

## 2013 Palestinian International Conference on Information and Communication Technology

## **PICICT 2013**

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