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1. Executive Summary

Prof Chang is a Professor in IT and Director of the Research Institute for Digital Ecosystems and Business Intelligence (DEBI Institute). She is also a Director for the Research Centre of Frontier Technologies for E-Enterprises at Curtin Business School. She has been awarded the Vice Chancellor's Outstanding Performance Award for 2005 and the Dean's Best Researcher of Year Award for 2005 and 2004. She has co-authored 2 books and has published over 300 scientific papers as book chapters, in international journals and at refereed conferences as well as numerous invited Keynote papers and Tutorials. These also include several ACM and IEEE Transactions papers which are the top journals in the field. She is currently holding 6 ARC large Discovery and Linkage grants and a Tier 1 Centre of Excellence grant and obtained cash from ARC, industry partners as well as Research Centre of Excellence funds of over $5 million for 2002-2011. All her research and development work has been in the areas of IT Applications for Business. She has supervised or co-supervised 10 PhD graduates to completion in the last 6 years. Her first PhD student Dr Rahayu has achieved Best Thesis Award in 2001 by Australian Computer Science Society.

Professor Chang has an extensive background, knowledge and skills in Academia, commerce and industry. She has worked in 4 different universities in Australia namely Curtin, Newcastle, La Trobe and Swinburne Universities. She has also delivered an on-line course for the Hong Kong Cyber University on Web Advertising and Publishing. She has been a CIO for Seapower Resources International, incorporating 40 warehouses in Asia, a multi-national logistics operator in Hong Kong and coordinate e-Logistics and e-Warehouse projects for 2 years and few years as a Senior Software Engineer for Philips Public Communication Limited on the Cable TV projects, Animal Research Institute on Farming project and Australian Airlines in an Exchange and Interest Rate monitor system.

Professor Chang has a PhD and research Master in IT and Software Engineering from La Trobe University, Australia

2. Qualifications

- Senior Member of IEEE
- Member of ACM
- Member of ACS
- Doctor of Philosophy (PhD) in 1997ş from Department of Computer Science and Computer Engineering, LaTrobe University, Melbourne, Australıa
- M. Phılosophy (Masters by Research) ın 1992, from Department of Computer Science and Computer Engineering, LaTrobe University
- Bachelor of Science, Department of Computer Science, Beijing University

3. Key Achievements

Research Grants obtained

(1) As CI (Chief Investigator), obtained a large ARC Linkage grant for 2006-2009 for $740,000 ($530K from ARC and $210K from Industry).
(2) As CI, obtained a large ARC Discovery grant for 2006-2008 for $282,000.
(3) As CI, obtained a large ARC Linkage grant for 2005-2007 for over 600K ($461,000 from ARC and $150,000 from industry partners)
(4) As CI, obtained a large ARC Linkage grant for 2004-2007 for $753,000 ($573,000 from ARC and over $150,000 from industry partner)
(5) As CI, obtained a large ARC Linkage grant for 2003-2006 for $182,198 ($152,000 from ARC and $30,000 from industry partner)
(6) As CI, obtained a large ARC Linkage grant for 2002-2006 for $452,000 ($252,000 from ARC and $200,000 from industry partner)
(7) As CI, obtained a large ARC Discovery grant of $164,000 for 1997-1999 and a smaller ARC grant in 2000.
(8) As Director, she led the team win the Tier 1 Centre of Excellence funds of total $1.15 million for 5 years (2006-2011).
(9) As Director, she let the team awarded the internal matching funds for the Research centre from CBS and Curtin fellowship funds for 5 years of over $2.2 million 2004-2011.
(10) As CI, obtained Area of Research Excellence grant from CBS for $210,000 for 2003-2005.
(11) As Director, Obtained PATREC Logistics Scholarships to support 2 PHD students of $104,000 for 2004-2006
(12) As Chief Investigator obtained large Industry funding over $51,000 for 2001 from the Kersley Group Ltd.
(13) As CI, obtained a large funding over $157,000 for 2001 from iPower Logistics International in 2001.
(14) As CI, obtained Industry funding of over $200,000 in cash for commercial projects from 1998-1999 and successfully completed these projects on-time and within budget (See Section 4).

Professional achievement

(15) Adjunct Professor in Chinese Academy of Science, Institute of Software, Beijing since 2000.
(16) Adjunct Professor for University Technology Sydney since Feb. 2006.
(17) Awarded Patent for Automated Usability Testing Software in 1997 and developed a new methodology for Usability Testing and Evaluation since 1996.
(18) Elected as an IEEE/IES ADCOM Member for 2006-2008. The International Administrative Committee which is the peak body for IEEE/IES Society worldwide.
(19) Vice Chair of IEEE/IES Industrial Informatics since Feb. 2006. Institute of Electrical and Electronic Engineers – one of the two key computing bodies in the US and Worldwide.
(20) Vice-Chair of IFIP (International Federation of Information Processing) Working Group 2.12/12.4 on Web Semantics since 2005.
(21) Appointed to be Associate Editor for IEEE Transaction on Industrial Informatics. Guest Editor of a special issue of the *Journal of Computer Communications* published by Elsevier, UK, on the topic of Software Engineering of Web Based Systems and Computer Systems Science and Engineering on XML Technologies.
(22) Conference General Chair for IEEE DEST conference from 2007 (new conference), Vice Chair for IFIP Workshop on Web Semantics since 2004 and General Chair for IEEE workshop in PDM since 2004. General Chair for ICATA 2005. General

Conference Co-Chair - The 4th Internal Conference on Mobile Business, Sydney. Technical Chair for IEEE Industrial Informatics 2005. A member of Organization Committee and Technical Program Committee member, as well as PC chair, track chair for many international conferences and workshops, including ICEIS, *IFIP Conference on Data Semantics of Multimedia Systems*, *International Conference on Database and Expert Systems Applications (DEXA)* etc; Also, in the past, has been National Secretary of the Australian Human Computer Interaction Special Interest Group between 1991-1992,

(23) Invited Keynote Speaker –7th International Conference on Information Integration and Web Based Applications and Services, Indonesia, Nov, 2006. 7th Conference on Business Intelligence, (BI 2006), Oct Sydney, IFIP Academy, July 2005 San Leopoldo, University of UNISINOS, Brazil, Title: 'Trust and Reputation for Service Oriented Environment'; Invited Keynote Speaker – IEEE International Conference on Applied Information Technology, July 2005. Sydney, Tile: 'Trust and Trust Relationships for Business and Commerce'

Leadership Achievement

(24) As a Research Centre Director, she led the team from a small University Centre of Excellence in 2003 to University Tier 1 Research Institute in 2006 and doubled the research output each year between 2003-2006 and in 2007, the output was tripled and was on the top reserach output (RPI defined by DEST) at Curtin among 40 centres/Institutes and 50 schools/departments.

(25) She is the number 1 Curtin most downloaded Authors and one of her co-authored papers was number 1 of most downloaded papers in 2007-2008 in Curtin's e-space and among all academics.
Top 50 List for Curtin Authors (http://espace.lis.curtin.edu.au/top50authors.html) and
Top 50 Papers (http://espace.lis.curtin.edu.au/top50papers.html).

(26) She led the Centre staff produced on average of 1/3 of total research output for the entire faculty in the last 3 years.

(27) Director and founder for a number of University research centres in ICT for Business and Commerce in Newcastle and Curtin Universities.

(28) Developed a *Software Engineering Project Standard Handbook* of over 500 pages for La Trobe, Swinburne and Newcastle Universities and also produced *Database and System Analysis and Design Techniques* Handbooks of over 300 pages each.

(29) Currently co-author of three additional books which are to be published in 2007-8.

(30) Successfully supervised to completion 10 PhD Theses, 9 Masters Theses, 14 Honours Theses and 8 MIT Minor Theses (1990-2002); currently supervising or co-supervising 18 PhD students.

(31) Continually obtained excellent teaching survey results from feedback of undergraduate and postgraduate students

4. Research

Prof Chang focuses on the following two fundamental research fields:
- Frontier Information Technologies
- ICT Applications

Prof Chang researches the science underlining the Frontier Technologies that are on the intersection between business, human endeavours and advanced information technologies, which form the very foundations of Business and IT in the networked economy. *She focus on* the building of specific services and information infrastructures to support the different application domains. It is important to realise that these do not constitute development work but rather Application Driven Research or domain oriented IT and IS research. Therefore, Professor Chang's research fields of interest include:

a. Frontier Information Technologies
- o Ontology and multi-agent systems
- o Data mining for Business Intelligence
- o Trust, Security and Risk in e-Business
- o XML, Web Services, P2P for collaborative environments
- o Web Engineering

b. ICT Applications
- o IT for Business and Commerce
- o IT for Health Informatics
- o IT for Logistics
- o IT for Education

a. Frontier Information Technologies

o <u>Ontology Based System Development</u>
  Professor Chang's research in this field includes:
  - Business intelligence through the use of ontologies and Data Mining
  - Seamless inter-organizational interaction through Trusted computing
  - Ontology based multi-site Software Development
  - Electronic document handling using XML
  - Information sharing on Digital Ecosystems

o <u>Data mining for Business Intelligence</u>
  Prof Chang's research covers:
  - Develop scientific Text and Document Mining methods that speed parsing, reading, classification of data, document, text through the use of *Extended* Natural Language Processing and domain ontologies.
  - Develop scientific Data Mining techniques for structure of information including web semi-structured information such as XML data, tree like structures.
  - Investigate Data Mining techniques for detecting non-compliant, aberrant, behavior and fraud in business applications and capital markets
  - Extend scientific techniques with model correlation approaches, neural networks coupled with generic and domain specific ontologies to abstract the knowledge from the content.
  - Develop a fuzzy semantic reasoning method which can be applied in various aspects of knowledge from the documents and broader organization intelligence.
  - Develop interactive Rating and Ranking techniques for representing knowledge with models, tables, etc.

o <u>Trust, Security, Privacy and Risk in Digital Business</u>
  Professor Chang's research work includes a co-authored book on Trust illustrating the importance of the research work in Trust in both the cyber world and real world risks.
  Trust, Reputation and their application to Digital Business;
  - Apply information and document security methods to protect all data and documents through the use of Watermarking and fingerprints

- Security in the context of Trust, and how Trust can be built to reduce the security risks;
- Risk factors and risk management involved in Trusted business and Trusted communications;
- The Dynamism of Trust, Trust Models, protocols, methodology of assigning Trust values, and how to build and maintain Trust in cyber communications and business transactions; and
- Trust and reputation in Web Services.

- XML, Wed Services, P2P for collaborative environment
  In this field, Professor Chang has been working on:
  - A methodology for transforming object oriented conceptual models into XML schema
  - A Mobile Agent based architecture for P2P and Web Services.
  - An adaptive workflow technique capable of modelling collaborative inter-organisational workflows and flexible workflows utilising activity diagrams and coloured Petri Nets.
  - Developing a methodology for software engineering of e-commerce systems that involves business process modelling, transformation and re-engineering as the first step in the software engineering process.

- Usability Evaluation and Web Interface Engineering
  Professor Chang has been working on: A technique for automated usability testing that greatly reduces the tediousness of usability testing which has been patented.
  - A methodology for usability evaluation based on fuzzy systems which has been extended to the evaluation of web usability systems.
  - A technique for modelling the logical data related aspects using Abstract User Interface Objects using perspectives of the OO Domain model.
  - A technique for modelling the flow of interaction using a flow of interaction net, a specialization of High Level Petri Nets. This is of particular importance in modelling the navigational aspects of web sites.

b. ICT Applications

IT for Business and Commerce
  Studies in these fields are distinguished from more general Computer Science fields in that these concentrate on the system as whole rather than just algorithms for a narrow problem.
  - It focuses on strategic implications for the business of adopting particular IT applications
  - It deals with IT and Business Strategies.
  - It address the support for the new business paradigms
  - It takes in issues related to the *process* of producing an IT application including effort and cost estimation, project management, human resource and budget management and process maturity such as CMM.
  - It also takes in issues of *methodologies* for production of IT applications such as: Object/Component and service oriented methodologies.
  - It addresses a number of *system* related issues such as, Security, Trust, Privacy and Risk Management.
  - It addresses *product* related characteristics such as: Reliability, Usability and Fault Tolerance.
  - Among the *classes of business and commerce applications* that are investigated here are for SMEs (small-medium enterprises), such as: Warehousing Information Systems, Transport Scheduling, Third Party Contractors, Container and Goods Track and Trace, Order capture and placement, Virtual Logistics Systems.
  - In viewing along a *different dimension* it includes: Procurement System, Self-organized Distribution system, Digital Integrated Supply chains.

IT for Health Informatics

In here, Professor Chang explores two research areas:

- Firstly, human disease information retrieval and knowledge sharing. Years of research and development of human, animal and plant diseases, has produced millions of papers, articles and journals whose accumulated volume is in petabytes and are available online through Journal Databases, Medical systems, etc. The sheer volume of bio-medical information on the web greatly hinders the ability of medical researchers, doctors, patients, and general public to process and integrate this information. Currently no tool is available to assist users to mine, retrieve, filter, integrate and interpret the human disease information from the multitude of combined sources. This project seeks to help organise knowledge for the human disease information area through an unified Ontology framework, Agent technology and the Ecosystem paradigm to develop an Intelligent Digital Ecosystem that enables information retrieval and knowledge sharing across all stakeholders.
- The second research area is to develop a technique for handling Genome and Protein Databases. Genome and Protein data is characterized by:
  a) High volumes of data;
  b) Distribution of the data amongst several different databases each with their own unique structure;
  c) Frequently lack of clear semantics. In order to cope with the extremely high volumes of data from multiple heterogeneous databases one needs the development of new information systems techniques. Considerable work also needs to be done to clarify the semantics of these data. This research will explore two different approaches to handling these problems namely:
     i) The use of ontologies;
     ii) The use of mediators to construct a reduced set of data that form an intelligent and active layer between clients and data resources.

IT for Logistics

In the last few years, Professor Chang obtained 2 ARC linkage grants on Collaborative Logistics which addresses the research area of workflow and business process automation and parterner information exchange systems include e-logistics, e-warehouses, 3PL/4PL and e-distribution centre systems. As the Internet becomes more wide spread and pervasive, the vision of intelligent and collaborative industrial environments with all logistics partners, manufactures, and end-users with dynamic, agile and reconfigurable enterprise structures has become a reality. As industrial systems have become more intelligent, automated, dynamic and distributed and monitoring and control of operations has shifted towards the electronic paradigm and is increasingly carried over the Internet as is the case for sales of e-services, the need for the scientific and engineering discipline of logistics informatics and Industrial informatics has emerged. Logistics activity represents approximately 9% of Australia's GDP - or $57 billion and it has been found that the introduction of collaborative logistic systems can achieve a 500% return on investment [E. Chang, M. West 2005, 2006].

IT for Education

There are two specific projects.
- develops a Framework for the Strategic Application of Learning Object Technology to Learning. This project provides strong links between innovation and learning as a recurring theme in studies of the Knowledge Economy. By understanding learner preferences, needs and requirements, it is possible to provide opportunities through an online learning environment that will improve the quality, variety and relevance of learning for all.
- develops an Automated Essay Marking System. This is one of the core projects in CEEBI which has already obtained two patents and has support from the WA Department of Education and Training (WA DET) and Macquarie Dictionary; potential savings in WA alone are estimated by the WA DET to be $400,000 per year and in Australia approximately $3 million a year. There are strong economic reasons for having an automated essay grading system that assesses content of essay, semantics of text, structures and style as well as syntax of the essay. There are also strong pedagogical reasons arising from the fact that the teacher or assessor is often reduced to looking at surface or mechanical features when faced with a large marking load, for reasons of time.

5. Scientific Publications

A1 Books (Authored Research)

1. Chang, E., Dillon, T.S., Hussain, F.K. 2006. *Trust and Reputation for Service-Oriented Environments*, John Wiley and Sons, UK (400 pages), ISBN: 0-470- 01547-0

2. Dillon, T.S, Chang, E., Rahayu, W. 2006. *Object-Oriented conceptual modelling and design,* in final stage of *completion* (2nd edition), John Wiley and Sons, UK. (450 pages)

3. Chan, H., Lee, R., Dillon, T.S., Chang, E. 2001. *E-commerce: Fundamentals and Applications,* John Wiley and Sons, UK (400 pages). ISBN 0-471-49303-1

A3 - Books (Edited)

4. Chang, E., Hussain, F.K. and Rosbotham, S., (2005) Industrial Informatics – Frontier Technology for the Future of Industry and Business' (Edited), IEEE Computer Society, NJ. USA, (500 pages) ISBN:0-7803-9095-4

5. Brookes, W., Lawrence, E., Steele, R., Chang, E., (2005) 'Mobile Business' (Edited), IEEE Computer Society, NJ, (700 pages) ISBN: 0-7695-2367-6

B1- Book Chapters

6. Wongthongtham, P., F. K. Hussain, E. Chang, and T. S. Dillon. 2008. Multi-site software engineering ontology instantiations management using reputation based decision making. In *LNCS-IFIP Advances in Web Semantics Volume 1*. Heidelberg: Springer.

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11. Chang, E. and Dillon, T.S., 1997. 'Automated Usability', *Testing In Human Computer Interaction INTERACT97*. Howard, S., Hammond, J. and Lingaard, G. (eds), Chapman and Hall, London, UK: 77-84.

C1 - Refereed Journal Papers

12. Hecker, M., T. S. Dillon, and E. Chang. 2008. Privacy ontology support for e-commerce. *IEEE Internet Computing* 12: 54-61.

13. Hadzic, F., Tan, H., Dillon, T.S. and Chang, E. 'Implications of frequent subtree mining using hybrid support definitions.' *Data Mining VIII - Data, Text and Web Mining and their Business Applications* (2007): 13-23.

14. Wongthongtham, P., Hussain, F.K., Chang, E. and Dillon, T.S. 'Multi-site software engineering ontology instantiations management using reputation based decision making.' *LNCS-IFIP Advances in Web Semantics Volume 1* (2007).

15. Zhao, S. and Chang, E. 'From database to semantic web ontology: an overview.' *On the Move to Meaningful Internet Systems* 64 (2007): 1205-1214.

16. Han, S., Dillon, T.S. and Chang, E. 'Mobile ad-hoc and sensor networks anonymous mutual authentication protocol for RFID tag without back-end database.' *Lecture Notes in Computer Science* 77 (2007): 623-632.

17. Rajugan, R., Chang, E. and Dillon, T.S. 'Sub-ontologies and ontology views: a theoretical perspective.' *International Journal of Metadata, Semantics and Ontologies* 2 (2007): 94-110.

18. Sidhu, A., Dillon, T.S. and Chang, E. 'Protein ontology instance store.' *On the Move to Meaningful Internet Systems* 64 (2007): 1348-1354.

19. Wongthongtham, P., Chang, E. and Aseeri, A.A. 'Towards social network based approach for software engineering ontology sharing and evolution.' *On the Move to Meaningful Internet Systems* 64 (2007): 1233-1243.

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321. Dillon, T.S. and Chang, E., 1994. 'Object-oriented technologies and engineering', *Proceedings of the 12th Avignon Expert Systems Conference*, France (Invited Keynote Paper)

322. Dillon, T.S. and Chang, E., 1994. 'Object oriented design', *Proceedings of the Artificial Intelligence Conference - AI 94*, Paris, France (Invited Sole Presenter)

323. Chang, E., 1993. 'An object-oriented approach to software reliability and software fault tolerance', *Proceedings of the Pacific Rim International Symposium on Fault Tolerant Computing*, Melbourne, Australia: 229-234.

324. Dillon, T.S. and Chang, E., 1993. 'Application of the object-oriented approach to power systems problems', *Proceedings of the PSCC-11*, Avignon, France: 21-32**. (Invited Keynote Paper)**

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5.5 Industry Reports

1. *E-Business Model For Warehousing and Logistics – 2000.* Pitec Report For Seapower Resources International, Hong Kong

5.6 Submitted Books

2. Sesisto, S., Dillon, T.S. and Chang, E.J., *Data Mining and Data Warehousing*, (In Preparation)

3. Chang, E.J., Dillon, T.S. and Sankar, P. (eds), 'Web Mining', submitted to *Lecture Notes In Computer Science*, Springer Verlag (In Preparation)

4. Chang, E., Hussain, F. and Dillon, T.S., *Advanced Trust and Reputation Management*, John Wiley and Sons (In Preparation).

5.7 Invited Tutorials for International Conferences

5. Chang, E., Dillon, T.S., Hussain, F.K. 2005. 'Trust and Reputation for Service Oriented Environments', IFIP Academy on the State of Software Theory and Practice, Port Alegre, Brazil (8 hours).

6. Chang, E., Dillon, T.S., Hussain, F.K. 2005. 'Trust and Reputation for Service Oriented Environments', IEEE International Conference on Industrial Informatics (8 hours), Perth, Australia.

7. Chang, E., Dillon, T.S., Hussain, F.K. 2005. 'Trust and Reputation for Service Oriented Environments', (**Best Presentation Award**). The 7th International Conference on Information Integration and Web Based Applications and Services, Kuala Lumpur, Malaysia (3 hours).

6. Supervision Experience

Supervised 14 Honours Theses in Computer Science/Engineering

1. Mr. Eka Gautama, *Work-flow Management Using Coloured Petri Net,* 2000
2. Mr. Alex Talevski,*Plug-n-Play, the Dynamic Architecture,* 2000
3. Mr. Rad Kotowski,*Compression Techniques for Virtual Reality System,* 2000
4. Mr. Jason Frank, *Usability Metrics for Automated Usability Testing,* 1998
5. Mr. Marjan Ilkov, *Project Plan and Estimation,* Nov. 1998
6. Mr. Tan Tran, *User Interface Design Using Flow Of Interaction Net,* Nov. 1998,
7. Mis. Qi Chen, *Usability Metrics for User Interface Design,* 1998
8. Mr. Andrew Clymp, *Computer Aided Usability Evaluation* 1997)
9. Mr. Marcus Crafter, *Cross Platform User Interface Development* 1996
10. Mr. Albert Ling, *A Case Tool for Transforming an OO model to an ER model* 1995
11. Mr. Denny Ovuka, *Knowledge-Based Approach to User Interface Design* 1995
12. Mr. Daniel J. Cook, *Usability Testing for User Interface Design using Fuzzy Systems* 1995
13. Mr. Timothy P Maher, Automated User Interface Design 1994
14. Mr. Dale Dixon, *Representations Suitable for Use in User Interface Design* 1994

Supervised 8 MIT Minor Theses in Computer Science at the University of Newcastle

1. Mr. Yogendra Udepurkar, 'Survey and Evaluation of Top Ten e-Commerce System', May 2002
2. Mr. Mohan Murugesan, Issues and Solutions in Developing e-Auction Systems, March 2002
3. Miss. Keerthini Shastry Jakkahalli, *Technical Issues in Database Connectivity,Ma*rch 2002
4. Mr. Kazi Akhter Hossain, Market Research on the Benefit of e-Commerce for Small Businesses, April 2002)
5. Mr. Leo Rao Pudhota, *Socio-economic Benefits of e-Auctions,* April 2002
6. Mr. Colin Healy, Domain Analysis and Software Engineering of Virtual Markets, April 2002
7. Mr. Fu-Shan Chu, *GUI Design Method for e-Auction Systems,* April 2002
8. Mr. Vidyasagar Potdar, *Open Source Model for IT Application Development,* Dec 2001

Supervised 8 Masters Theses in IT/Software Engineering

1. Mr Brian SK. Wong, *Measurement Of Usability Of Web Application Using A Fuzzy Systems Approach, 2002*
2. Mr Kieu Poh Gan, *Automatic Usability Evaluation Method,* May 1999
3. Ms Qi Chen, *Usability Metrics For User Interface Design,* Dec 1999
4. Mr S Singh, *Critical Evaluation Of Prototyping Methodologies For Software Development,* 1994
5. Mr J Zhang, *Prospects For An Engineering Discipline Of Software Engineering And Traditional Engineering,* 1994
6. Ms Jo Lam, *Evaluation Of Description Systems In Software Development,* 1993
7. Ms Wenny Rahayu, *Relational Database Design Using Object-Oriented Methodology,*1993
8. Ms B Ipek, *Integration Of Software Engineering And Database Technology,* 1993

Supervised 10 PhD Research Theses in IT/Software Engineering

1. Dr Wenny Rahayu, 'T*ransformation of Object Oriented Models for Relational Databases,* PhD awarded in April 2000. **ACS Best Thesis Award** in February 2001
2. Dr. Alex Telavski, '*Re-configurable Component-based Software Architecture',*PhD, awarded in 2004.
3. Dr Torab Torabi, '*Multi-site Project Management,* 'PhD, awarded in 2004.

4. Dr Carlo Wouters, '*A Formalization and Application of Ontology Extraction,* 'PhD award in, 2005
5. Dr. R. Rajugan, '*Conceptual Views in XML'*, PhD awarded in May 2006.
6. Dr. Maja Hadzic, '*Ontology-based Multi-agent Systems for Human Disease Knowledge Sharing',* PhD awarded in July 2006.
7. Mr. William Gardner, '*Human Computer Interaction   for Web Application',* PhD under examination, 2006.
8. Ms. Pornpit Wongthamtham, '*Ontology-based Multisite Software Development Methodology',* PhD under examination, 2006.
9. Mr. Vidy Putdor, '*Information Hiding through Stagnography and Watermarking',* PhD under examination, 2006.
10. Mr. Farookh Hussain, '*Trust Management for e-Business',* PhD under examination, 2006.

Professor Chang is currently supervising and co-supervising 12 PhD students.

7. Academic Teaching Experience

2003- Current **Director and founder of Research Institute** for Digital Ecosystems and Business Intelligence, University Tier 1 Centre of Excellence, since 2006 **Director and founder** for the Centre for Frontier Technology for E-Enterprises since 2003 **Professor** in IT and Software Engineering**,** IS School, CBS	
	Subjects Taught : Electronic Commerce, Systems Analysis and Project Management EC501 Electronic Commerce AS205 Advanced System Analysis PS391 Co-supervision of final year student projects **Other Duties:** • Developed several Master of Logistics Degree Programs • Off-Shore Program Development • Development of Research Institute and Centre • Supervision of PhDs and running Centre of Excellence
2000-2002 (include leave without pay duration) **Director and founder** for the Centre for IT Applications and Logistics Informatics **Associate Professor** in Computer Science and Software Engineering	
	Subjects Taught: Software Engineering, Electronic Commerce and Project Management SENG311/SENG633 Advanced Software Engineering SENG421 4th Year Software Engineering Projects (Full Year) COMP454 4th Year Electronic Commerce 8 MIT Student Projects
	Other Duties: • Obtain Industry funding; • Project management • Supervision of Postgraduates • Managing IT/e-Commerce Research Team, 30 Software Engineers. • BSc and MIT Software Engineering Degree Program Development and Coordinator
1993-2000 (include leave without pay duration) **Senior Lecturer/Lecturer** in Computer Science and Engineering LaTrobe University (Including 1.5 years leave to Industry)	
	Subjects taught: CS3PRJ Project Management and Software Engineering **1993,1997,1998**
	Course Level: Third year and Graduate Diploma Course Duration: Whole year compulsory subject Teaching Load: Gave 36 hours of lectures; 60 hours of group supervision • Design projects • Develop project guidelines • Develop 5 assignment submissions assessment criteria, and exams for projects • Produce Project Development Standard Handbook (200 pages) • Course organization • Course Syllabus, • Supervise Tutors (3-4 p/t staff) and many groups of students.
	Subjects taught: C2SDT System Design Techniques **1993 – 1998**
	Course Level: Second year and Graduate Diploma Course Duration: Half year subject, Teaching Load: Gave 26 hours of lectures; • Design assignments, all tutorial exercises and exam each year, • Produce Course Book (300 pages)

	• Produce examples and additional reading materials for tutors and students. • Course organization
	Subjects taught: CS3DME Data Modelling and Engineering **1995-1997**
	Course Level: Third year and Graduate Diploma Course Duration: Half year subject, Teaching Load: Gave 10 hour lectures (teaching half of the course) • Design assignments, tutorial exercises and exam
	Subjects taught: CS3UIE User Interface Engineering **1997-1998**
	Course Level: Third year and Graduate Diploma Course Duration: Half year subject Teaching Duties: Gave 20 hours of lectures; 10 Lab classes (Jointly taught) • Design assignments, all lab exercises and exam
1990-1992	**Lecturer** in Computer Science and Software Engineering, Swinburne University
	Teaching Subjects included: Software Engineering (Graduate Diploma) Advanced Software Engineering (Masters by Course Work) Object-Oriented Analysis and Design (Graduate Diploma) Human Computer Interaction (Teaching part of 2nd year and Masters by Coursework) Database Design and Implementation in SQL (Graduate Diploma) Software Project (Graduate Diploma, Supervisor of several groups) Software Practice and Ada (Tutorials and Lab classes1st and 2nd year)

8. Project Management and Industrial Experience

The following sections describe the numerous projects that Professor Chang has been involved in both as a Project Manager as well as a Software Engineer from 1988 until 2001.

2000 – 2001 CIO and Head of IT: Seapower Resource International Limited, Hong Kong, Coordinate the development of E-*warehouse Management and E-logistics Management System for the company (Professor Chang take leave without pay from her academic position)*

1999 – Senior Software Engineering, Philips Public Communication Limited, Victoria, project: *Netcaptain – Telstra broadband cable TV and modem network management* Melbourne, Australia, *(Professor Chang take leave without pay from her academic position)*

1988-1989, Programmer: Animal Research Institute, Victoria (whıle beıng student)
Project: *Sheepo: A Sheep Farm Management Package.* The project was sold for over $200K to NSW Animal Research Institute.

1987-1988, Programmer: George Kaufmanns and Associates consulting for Australian Airlines, Victoria. Project**:** *Exchange Rate and Interest Rate Monitor* for Australian Airlines (whıle beıng student)
The renewed system sped up 80% of calculation time for exchange and interest rates.

1985 -1986, Computer Engineer: Chinese Academy of Science, Beijing, China
Project**:** *AP29 A/D-D/A Converter, Data Acquisition and Signal Processing*
The system was sold nationwide to Government organizations.

Project under taken for Industry and Business partners as an Academic
o **Jan – Oct 2000.** Front Desk Systems Pty Ltd, Victoria
   Completed project: *An e-Commerce System for Club Membership Management*
o **April – Oct 2000.** Australian Soccer Clubs, Olympic Sports Medicine Centre Pty. Ltd, Melbourne, Australia, Completed project: *An Internet Based Australian Soccer Injury Database.*
o **Apr 1998 - Jun 2000.** Hygrade Cutting Formes and Laser Die Pty. Ltd., Victoria, Completed project: *Hygrade Real-Time Production Control System*
o **Dec 1998 - Jun 1999.** Australia Football Clubs, Completed project: *FIT 2000* (fitness, injury, treatment tracking system)
o **Jul 1998 - Feb 1999.** La Trobe University Central Administration, Melbourne
   Completed project. *Multimedia and Virtual Reality Web System For Student Services*
o **Dec 1997- Feb 1998.** Life Wise Australia Pty Ltd, Melbourne
   Completed project: *Body Weight Controller*
o **Mar 1997- Oct 1997.** Sports Technology Australia Pty Ltd, Melbourne
   Completed project: *Nutrition Analyser. This project awarded 1997/1998 Australian Information Industry Award.* Articles in *Doctor s Weekly* and *The Australian Medical Journal*, September 1999

As a Project Manager to ensure that projects are completed on time, within budget and to the customer satisfaction, Professor Chang has also carried out (and continues to carry out) the following tasks:

- Team working rules and regulations definition
- Employee skills classification, task allocation and individual responsibility assignment
- Log book and progress report reviews
- Bug books and user feedback tracking
- Motivation and coordination between team members and team leaders
- Quality control of implementation and documentation
- Team meetings and day to day supervision
- Periodic oral presentations and submissions
- Editing and revision of user manuals and system maintenance manuals
- Problem identification, decision making, strategy development
- Workload analysis and time-effort estimation, budget planning
- Negotiation of user requirements and funding support

9. References

Referees	Reason	Administration Team work Industry collaboration	Research Quality and impact	Teaching Quality and impact
Prof Tharam Dillon Ex Dean Faculty of Engineering, UTS, Phone: 0418 122 830 Email: tharam@it.uts.edu.au	▪ Co Investigator of CRC, ARC Discovery and Linkage Grants ▪ Head of School between 1993-1999	Yes	Yes	Yes
Prof Geoff Crockett Ex PVC 2003-2007 Of Curtin Business School Phone: 08 9266 9266 Email: Geoff.crockett@cbs.curtin.edu.au	▪ Leadership in research management	Yes	Yes	
Prof Barney Glover Ex DVC research for curtin 2003-05 Now,The University of Newcastle Phone: 02 4921 5000 Email: Barney.Glover@newcastle.edu.au	▪ PVC (Research) of Curtin between 2003-2005	Yes	Yes	
Prof Brian English DVC The University of Newcastle Phone: 02 4921 5000 Email: Brian.English@newcastle.edu.au	▪ DVC (Research) of Newcastle	Yes	Yes	

Appendix 1: Highlights of Teaching

The following section brief outlines major subjects taught and highlights some of the teaching contents.

Subject:	Software Engineering and Project Management

Students in Computer Science and ICT Courses currently have to acquire six major learning skills in software development:

(1)   Learning how to carry out team based software development.
(2)   Learning how to decompose and manage a large software project lasting over the whole academic year.
(3)   Learning how to meet deadlines, within budget, and balance between quality and quantity.
(4)   Learning how to communicate effectively and professionally within group and with end customers
(5)   Learning how to utilise quality assurance techniques and standards to produce high quality software.
(6)   Learning how to carry out analysis and design which turns an ambiguous and incomplete set of user requirements into a precise and complete set of specification on which to base the software design.

Subject: System Analysis and Design Techniques

This course explains the detailed system design techniques (SDTs) for describing the models that arise from analysis as well as design. Thus they are introduced to the following detailed design techniques.

(1)   Entity-relationship modelling techniques
(2)   Object-oriented modelling techniques
(3)   Decision tables and decision trees
(4)   Data flow diagrams and structure charts
(5)   State-transition diagramming techniques
(6)   Petri-Net modelling techniques
(7)   Flow of interaction diagramming techniques

Subject:	Human Computer Interaction

Recently, significant advances have been made in the use of Object-oriented Technology and component based languages and tools for building more user-friendly environments such as windows and multimedia. To facilitate building a user interface in such environments, many software tools are available, such as Microsoft Foundation Class, Object Windows Library and Object-oriented programming Languages, such as C++, Java, J Builder, Delphi, C++ Builder, etc.

Sufficient attention has to be paid to the methodology of designing the user interfaces. The methodology helps the student in the earlier stages to obtain the full specification of GUI and critically evaluate the completeness of UI proposal, the logic of flow of interaction, the correctness of task representation on screens. It also helps the proper integration of the user interface design with the application software itself. This approach leads to interfacing the User Interface (UI) Objects with the rest of the application software and the database.

In addition to the above, are guidelines associated with the development of user interfaces for particular environments. Thus we see CUA (Common User Access) developed for IBM environments, Open Look/Motif developed for X11 windows type environments, etc.

Subject:	Database Analysis, Design and Implementation (SQL)

Providing a basis for a deep understanding of relational database systems, and skills in analysis, design and programming for DB systems. The teaching goals are:

(1)   solid understanding of the fundamentals of database architecture including client-server;
(2)   data manipulation (SQL); and
(3)   Database development techniques.

Thus the following topics are introduced:

- General database architecture that serves as a framework on which the course is built. External level of DBMS, logical, physical and conceptual schema is discussed in detail.
- Introduction to SQL.
- Introducing data models such as Relational model and Object Oriented models. Transformation rules from E-R model to Relational Schema as well as Normalization techniques.
- Database integrity and security.

Subject:	e-Commerce

Teaching Objectives:
1. an understanding the Architecture and four types of e-Commerce Systems
2. a broad understanding design methodology for Client side e-Commerce Systems and Client Side Programming and usability of Client Side Systems
3. a broad understanding of basic components of Server Side e-Commerce Systems and Server side programming technologies
4. a broad understanding of Web advertising and marketing
5.   Introduction of Security and Privacy
6.   Introduction of Cryptography
7.   Introduction of e-Payment
8.   Java and XML technologies

Text Book: Chan, Lee, Dillon, Chang 'E-Commerce, Fundamentals and Applciations' John Willy and Sons 2001

Subject:	XML and XML Databases

Teaching Objectives:

An XML document is a database (in the strictest sense of the term) (Ronald Bourret 2002), self-describing (the markup describes the structure and type names of the data, although not the semantics), portable (Unicode), and it can describe information object hierarchy. In here, we shall learn XML, XML databases and its surrounding technologies include: storage (XML documents), schemas (DTDs, XML schema languages), query languages (XQuery, XPath, XQL, XML-QL, QUILT, etc.), programming interfaces (SAX, DOM, JDOM), and so on.

Appendix 2: Description of PhD and MSc Theses

PHD Research Thesis:
Object Oriented User Interfaces and Usability Evaluation

Overview:
The research work addresses three main problems related to the design, evaluation and testing of user interfaces. It considers the design of a user interface within the setting of the Object-Oriented Paradigm. It divides the design process into two main phases, namely: (I) the logical design of a user interface; (ii) the perceptual design of a user interface.

The logical design uses perspectives to identify abstract UI objects. The thesis formally defines the notion of a perspective. In addition, the logical design defines a pictorial presentation of the screens and defines the flow of interaction of the user interface using Flow of Interaction Net (FIN). This representation of the Flow of tasks using FINs allows the designer to identify any flows that are illogical, incorrect or incomplete. This helps identify missing screens and illogical flow sequences. The thesis defines the semantics of this Flow of Interaction Nets.

The second problem addressed is that of measuring the Usability of a user interface. Six factors are identified as important in the determination of Usability namely: feedback, consistency, error prevention, performance, and error recovery and user opinion. As each of these factors and Usability itself are fairly imprecise concepts, the Fuzzy set paradigm was chosen as the framework of this metric.

Lastly, the thesis addresses the problem of automating the Usability Testing of a user interface. Previous Usability Testing methods utilise external devices such as video and audio recordings which are tedious and time consuming to review. The thesis gives the specification, design and implementation of a completely automated Usability testing tool. This tool runs in the background unobtrusively while the user proceeds to perform a specified set of tasks on the application. It collects information on all user actions, such as keystrokes, mouse clicks, mouse movements, windows open and closed and time stamps these. It displays analysis this information and also generates metric automatically.

Masters by Research Thesis:
A Prototyping Methodology for User Interface Design and Its Application

Overview:
This thesis develops a methodology for the design of high quality Human-Computer Interfaces and the application of the methodology to the design of a practical software system. It firstly examines the physiological and psychological factors, which affect the design of Human-Computer Interfaces, and discusses the various techniques that have been developed to date. The thesis proposes a two-phase methodology of Human-Computer Interface design. The first phase, called the Conceptual Design is concerned with capturing the abstract model of the problem domain, particularly as it is understood by the users of the system. This involves ascertaining the system functions, determining the sequencing of these functions, and defining the flow of interaction for each of the functions. The second phase is concerned with Perceptual Design of the system. This covers all aspects of the physical design of the user interface. It covers such things as menu designs, screen formats and layout, error handling, pop up and pull down menus, help screens, as well as design considerations governing the representation of various forms of graphical output.

Since a gap often exists between the system designer s and user s view of an interface, a prototyping methodology is used to facilitate the perceptual design. The methodology is sufficiently simple to be used by practicing software designers, and results in a well-designed system interface, leading to enthusiastic acceptance of the system by users.

Appendix 3: Service on Committees and Professional Activities

Professor Chang has served in the following honorary positions and Committees between 1999 and 2005:

- Elected IEEE/IES ADCOM Member for 2006-2008. The International Administrative Committee which is the peak body for IEEE/IES Society in the USA.
- Vice Chair of IEEE/IES Industrial Informatics from 2006. Institute of Electrical and Electronic Engineers – one of the two key computing bodies in the US and Worldwide.
- Program Committee Member, Member of Editorial Board, IEEE Transaction of Industrial Informatics, Monash University, Australia, 2005 – 2006
- Member of Editorial Board, International Journal on Grid and Web Services, David Taniar, Monash University, Australia, (Editor-in-Chief, International Journal on Web and Grid Services), 2004 – 2006
- Technical Program Chair for IEEE Conference on Industrial Informatics, INDIN 2005 – to be held in Perth, 2005
- Conference Program Chair, International Conference on Mobile Business, Darling Harbour, Sydney, June 2005
- Invited Speaker SEMISH 2005. San Leopoldo, University of UNISINOS, Brazil, 25-29 July ,2005
- Workshop Chair, DEXA 2005. Copenhagen, Denmark, 22-26 August 2005
- Member of Program Committee, TrustBus, Copenhagen, Denmark, 22-26 August 2005
- Member of Program Committee, PDM Workshop Chair, WebS, Copenhagen, Denmark, 22-26 August, 2005
- Guest Speaker presentation, Australasian Production and Inventory Control Society, February 2005
- Chair of Workshop on PDM – Privacy Data Management, PDM Workshop at ICDE 2005 Conference, Tokyo, Japan, 5-8 April, 2005
- Member of Program Committee, ICEIS 2005. Miami, Florida, USA
- Conference Track Chair, International Conference on Business and Information BAI 2004 - Taipei, Taiwan, March 2004
- Member of the International Program Committee for ICEIS 2004 - Porto, Portugal, 14-17 April 2004
- Presentation and collaboration with staff on 'Ontology Based Software Engineering for Multisite Software Development of Lancaster University, UK, 29 April, 2004
- Presentation and collaboration with staff on Ontology Based Software Engineering for Multisite Software Development'5th of VUB, Brussels, May, 2004
- Special Session Chair – INDIN 2004. Berlin, Germany, 24-26 June 2004
- Special Session Chair Co-ordinator IEEE Conference on Industrial Informatics - Berlin, Germany - 24-26 June, 2004
- Member of Program Committee, ICWL 2004 Beijing, China, 8-11 August, 2004
- Member of International Program Committee for ACM Workshop on Secure Web Services (SWS) to be held in conjunction with the 11th ACM Conference on Computer and Communications Security, Washington DC, USA, 29 October, 2004
- Member of International Program Committee for 16th International Conference on Databases and Expert Systems Applications, DEXA 2004. Spain, September, 2004
- Member of Program Committee DaWaK 2004 – 6th International Conference on Data Warehousing and Knowledge Discovery, Zaragoza, Spain, 1-3 September, 2004
- Member of Program Committee MATES 2004 Erfurt, Germany, 29-30 September, 2004
- Member of Program Committee, ACM Workshop on Secure Web Services (SWS) held in conjunction with the 11th ACM Conference on Computer and Communications Security Washington DC, USA, 29 October, 2004
- Member of the Working Group, OTM Confederated International Conferences 04 – IFIP, Cyprus, 25 October, 2004
- Workshop Chair - Trust, Security and Risk Management in Industrial Systems , Special Session Chair - Shield Privacy Data Mining Method for Privacy and Data Security in Virtual Community IECON 2004 Busan, Korea, 2 – 6 November, 2004

- Member of the International Program Committee for 14th International Conference on Database and Expert Systems Applications, Prague, Czech Republic, 1-4 Sept, 2003
- Member of the International Program Committee for International Conference on Web and Communication Technologies Conference in Seoul, Korea June 18-20, 2003
- Member of International Program Committee and Workshop Chair for 14th International Conference on databases and Expert Systems Applications DEXA 2003. Prague, Czech Republic, Sept, 2003.
- Country Vice chair for Asia Pacific Internet Conference, Korea July 2001
- Member of the International Program Committee for 4th International Conference of the SCI (Systematics, Cybernetics and Informatics) and Session Chair on Software Engineering Education and Practices, 23-26 July, 2000
- Member of the International Program Committee for IFIP Conference on Data Semantics – I, DS-8, New Zealand, January, 1999
- Member of the International Program Committee for the Asia Pacific Multimedia Web Conference, Hong Kong 27-29 September 1999
- Session Chair and Panel Chair at Asia Pacific Multimedia Web Conference, Hong Kong 27-29 September, 1999

Professor Chang as member of International Conference Program Committees is reviewing over 50 Scientific papers a year include book and journal reviews, Master Thesis and PhD thesis, as well as Commonwealth ARC funded grant applications.

Professor Chang has been invited to present tutorials and keynote addresses at the following international conferences:

- Chang E., West M., 2006 'Digital Ecosystems, a next generation of collaborative environments', **Invited Keynote**, to appear, The 8th International Conference on Information Integration and Web Based Applications and Services (iiwas2006), 4-6 December 2006. Yogyakarta, Indonesia
- Chang E. 'Business Intelligent Technologies -Trust, Reputation and Recommendation Systems' **Invited Keynote**, to appear, 7th National Conference on Business Intelligence, BI 2006. 23-24 Oct 2006. Sydney
- Chang, E., Dillon, T.S. and Hussain, F.K., 2005. 'Trust and Reputation', *IFIP Academy on the State of Software Theory and Practice*, Port Alegre, Brazil, 18 July 2005 **(Invited Keynote Paper)**
- Chang, E., Dillon, T.S. and Hussain, F.K., 2005. 'Trust for E-Business', *3rd International Conference on Information Technology and Applications (Icita),* Sydney, Australia, 4-7 July, 2005. **(Invited Keynote Paper)**
- Chang, E., Dillon, T.S. and Hussain, F.K., 2005. 'Trust and Reputation', *IFIP Academy on the State of Software Theory and Practice*, Port Alegre, Brazil, 18 July 2005 **(Invited Keynote Paper)**
- Dillon, T.S., Chang, E. and Hussain, F., 2005. 'Trust and Reputation for Service Oriented Environment' iiWAS 2005. KL, Malaysia, (**Best Presentation Award**)
- Chang, E., Dillon, T.S. and Talevski, A., 2003. 'Web Service Integration in the Extended Logistics Enterprise', *Proceedings of the IEEE International Conference on Industrial Informatics*, Banff, Canada. (**Invited Keynote**)
- Chang, E., 2003. 'What smaller businesses can do to join in the supply chain makeover', **Invited Keynote** Speaker at the *Australian Conference on Freight Solutions*, Melbourne, Australia.
- E Chang, 1994. invited to be the sole Presenter of a tutorial on *Object Oriented Design* at the *Artificial Intelligence AI 94 Conference*, Paris, France, June 1994
- E Chang, 1994. invited to be the sole Presenter of a tutorial on *Software engineering of artificial intelligence techniques* to the *4th Pacific Rim Conference on Artificial Intelligence*, Beijing, China, August 1994.

Some Attachments
(could be submitted on request)

A1 – A 4: Curtin Appointment, Citizenship, and Higher Degree Certificates
B1 – B14: Awards for Research Excellence (includes grants)
C1 – C5: Award for Teaching Excellence (Curtin, Newcastle, LaTrobe, Swinburne)
D1 – D7: Other achievements