NANYANG TECHNOLOGICAL UNIVERSITY
BioInformatics Research Centre

ANNUAL PROGRESS REPORT: 2003 - 2006

BioInformatics Research Centre (BIRC)
Nanyang Technological University, Singapore

Name of Centre	BioInformatics Research Centre (BIRC)
Establishment Date	February 12, 2002
Current Director	A/P Jagath C. Rajapakse
Centre's Goals/ Objective	To provide the interdisciplinary environment and training for students and researchers to engage in leading and cutting edge research in bioinformatics, and thereby become a part of the life sciences workforce in Singapore and elsewhere. To invent and develop bioinformatics techniques and tools for discovery of knowledge from life sciences data in order to understand biological function and disease, leading to discovery and effective delivery of drugs.

Compiled By:
Norhana Ahmad
Executive Officer

May 2007

I. INTRODUCTION

Bioinformatics is an emerging research area marrying biology and computer science and aiming to develop *in-silico* techniques and tools for extracting knowledge from life sciences data in order to discover novel drugs and their efficiently delivery for human disease. The demand for bioinformatics research is evidenced by continuing explosion and implosion of high throughput biological data, future prospects for personalized medicine, and the emergence of new journals in the area. Evidently, *in-silico* biology or bioinformatics will play a major role in future biology and medicine.

BIRC brings together students, researchers, and faculty in different schools and backgrounds at NTU to foster advanced research in bioinformatics. The existence of BIRC puts NTU and its faculty at the forefront of cutting edge basic and applied research.
BIRC also facilitates coursework and research projects of M.Sc. (Bioinformatics) and Ph.D. (SMA-Computational and Systems biology) programs.

BIRC has become an internationally known and reputed research institute not only because of its publications on high-impact journals but also due to involvement of its staff in international events and organizations.

A/P Jagath Rajapakse (with Prof Raj Acharya) founded IAPR Technical Committee (TC-20) on Bioinformatics and IAPR Workshop on Pattern Recognition in Bioinformatics (PRIB). The secretariats and web sites of IAPR TC-20 and PRIB are maintained by BIRC.

Several BIRC faculty members served as Guest Editors of recent Special Issues relating to bioinformatics in reputed journals. A/P Jagath Rajapakse has been appointed as an Associate Editor of IEEE Transactions on Computational Biology and Bioiformatics.

BIRC faculty have actively engaged in and chaired international conferences (example, CIBCB 2007, EvoBIO 2007, PRIB 2007).
BIRC has led the initiatives to bring in international collaborators, enabling NTU faculty to work with experts in the field and on cutting edge research projects, leading to PI initiated grants and projects.

II. RESEARCH AREAS

- *Computational Biology*: bio-sequence analysis, signal and motif detection, protein structure and interaction prediction, gene and protein expression analysis, phylogeny

- *Structural Genomics and Proteomics:* Protein structure prediction, protein-protein interactions, protein classification, modeling, and docking, mass spectroscopy.

- *Systems Biology*: gene and protein interaction networks, pathway analysis, tissue systems biology, neural systems biology, immune systems biology, cancer systems biology

- *Bio-imaging and image informatics*: functional brain imaging, microscopic image analysis, cell mining, stem cell image analysis

- *Drug Discovery and Trial Design:* Immunoinformatics, modeling human immune system, medical informatics

- *Computer systems for bioinformatics:* Parallel algorithms and architectures for bioinformatics, grid computing, reconfigurable and embedded systems for bioinformatics

III. COLLABORATORS

a. INTERNATIONAL COLLABORATORS (OUT OF 25)

- Bioimaging Centre, Whitehead Institute, MIT, USA on tissue systems biology.
- RIKEN, Japan on brain imaging with Brain Sciences Institute and on gene annotation with Genomic Institute.
- Swiss Institute of Bioinformatics (SIB) on plant genome annotation.
- Institute of Cytology and Genetics, Russian Academy of Sciences, Novosibirsk, Russia on detection alternate signal sites.
- Princeton University, USA on cellular images processing.
- University of Ulster Jordantown, North Ireland on functional genomics.
- Department of Anatomy and Cell Biology, University of Toronto, Canada on cellular imaging.

b. LOCAL COLLABORATORS

- BioInformatics Institute (BII);
- Genomic Institute of Singapore (GIS);
- Institute of Infocomm Research (I2R);
- National Neuroscience Institute (NNI);
- Singapore General Hospital (SGH);
- National Cancer Centre (NCC);
- Tan Tock Seng Hospital (TTSH);
- Mount Elizabeth Hospital; National University of Singapore (NUS);
- and industry such as Sun, HP, Genvea, etc.

IV. CONFERENCE / WORKSHOPS

a. INTERNATIONAL

- 2nd IAPR Workshop on Pattern Recognition in Bioinformatics (PRIB 2007), Oct 1 – 2, Singapore (General Chair: A/P Jagath C. Rajapakse, Sponsor: International Association of Pattern Recognition, in progress)
- IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB 2007), Hawaii, April 1 -5, 2007 (General Co-Chair: Jagath C. Rajapakse, Tutorial Speaker: Jagath C. Rajapakse)
- European Conference on Evolutionary Computation, Machine Learning, and Data Mining in Bioinformatics (EvoBIO 2007), Valencia, April 11- 14, 2007 (Program Co-Chair: Jagath C. Rajapakse)
- International Workshop on Pattern Recognition In Bioinformatics Workshop (PRIB 2006), Hong Kong, Aug 20, 2006 (Sponsor: TC-20 IAPR, Program Co-Chair: Jagath C. Rajapakse)
- 1st Virtual Training Workshop in Bioinformatics (Speakers: Jagath C. Rajapakse, Meena Sakharkar, Manoranjan Dash; Organizing Committee: Jagath C. Rajapakse, Norhana Ahmad, Tan Wan Quan)
- 3rd Asia-Pacific Bio-informatics Conference (APBC 2005): Special Interest Group (SIG) meeting on Structural Bio-informatics (Co-chair Cai Yiyu); Student Symposium (Chair: Kwoh Chee Keong)

b. LOCAL

- Workshop on Computational Analysis of Proteomics Data (Jun 2005)
- Recent advances in Bioinformatics and Computational Biology (March 8, 2003, Chair: Jagath Rajapakse)
- gRNA Workshop (May 20, 2004, Sponsored by Genvea Biosciences)
- Genes, Proteins: Expressions and Interactions, (Dec 12, 2003; Chair: Jagath C. Rajapakse)
- SC & MPI Training Workshop, (Dec 1-5, 2003, Sponsor: Hewlett Packard, Asia)

V. SPECIAL ISSUES OF JOURNALS

- Pattern discovery of life sciences data, *IEEE Engineering in Biology and Medicine Magazine* (Guest Co-Editor: Jagath C. Rajapakse)
- Computing architectures and acceleration for bioinformatics algorithms, *Journal of VLSI Signal Processing Systems* (Guest Co-Editors: Lin Feng, B. Schmidt)
- Computational Intelligence in Computational Biology and Bioinformatics, *IEEE Transactions on Computational Biology and Bioinformatics* (Guest Co-Editor: Jagath C. Rajapakse)
- Softcomputing in Bioinformatics and Medical Informatics, *Softcomputing* (Guest Co-Editors: Jagath C. Rajapakse, Lipo Wang)

VI. STATISTICS

		Total
Present Academic Staff	Number of core staff	37
	Number of affiliates	22
Present Research staff	Number of research staff	13
Postgraduates (PhD)	Number of existing PhDs	20
PhDs awarded	Number of PhDs awarded	20
Postgraduates (MEng)	Number of existing MEngs	1
Masters awarded	Number of Meng awarded	10
Research grants	Number of external research projects	14
	Total value S$	$6,550,200
Consultancies	Number of consultancies	-
	Total value S$	-
Publications	Number of articles published in refereed journals	180
	Number of refereed conf papers	208
	Number of keynote addresses	-
	Number of other *(if applicable)*	-
	Total number of publications	388
Other outputs (e.g. patents, licenses)	Number of patents (filed/granted)	3
	Number of Technology Disclosures	-
	Others…	1

VII. CURRENT ACADEMIC STAFF

a. CORE

No	Name	School	Research Expertise
1	He Yulan	SCE	Spoken Language Understanding; Spoken Dialogue Systems; Data Mining; Information Retrieval
2	Jagath C. Rajapakse	SCE	Computational and Systems biology; Brain Imaging; Machine Learning
3	Jagdish C. Patra	SCE	Intelligent Signal Processing; Data Security and Data Mining; Data Communication Networks
4	Kwoh Chee Keong	SCE	Biomedical Engineering related research: particularly in medical image processing lesion identification; probabilistic inference and classification; and augmented reality
5	Lin Feng	SCE	Bioinformatics; High Performance Computing; Computer Graphics; Visualisation
6	Manoranjan Dash	SCE	Data Mining and Knowledge Discovery; Machine Learning; Parallel Algorithms; Bioinformatics
7	Miao Chun Yan	SCE	Software agent; MAS; Agent-Oriented Software Engineering; Semantic Web/Grid
8	Narendra S. Chaudhari	SCE	Algorithms Optimisation Techniques; Theoretical Computer Science; AI: Computational Learning, Neural Computing, Parallel Computing
9	Ong Yew Soon	SCE	Robust Evolutionary Search; Complex Engineering Design; Problem Solving Environment; Artificial Intelligence; Bioinformatics; Bio-medical Applications
10	Sourav S. Bhowmick	SCE	XML Data Management; Biological Data Management Mobile Data Management; Web Mining; Web Warehousing
11	Tan Eng Chong	SCE	Signal Processing; Circuits and Systems; Computational Intelligence; Bioinformatics; Software Designs & Algorithms; Multimedia Applications
12	Christian Schonbach	SBS	Genomics & Genetics; Comparative Genomics; Molecular Analysis
13	Jaume Torres	SBS	Small membrane proteins (integrins, viral envelope proteins, bacterial toxins, pores, antibiotic peptides)
14	Lars Nordenskiöld	SBS	DNA packaging and electrostatic interactions

15	Li Jinming	SBS	Bioinformatics methods of gene expression; Gene regulatory network analysis
16	Mu Yuguang	SBS	MD simulation method and data analysis method development; DNA dynamics; DNA-protein; DNA-counterions interaction study; RNA dynamics and folding study
17	Salil Kumar Bose	SBS	Cardiac energetics
18	Ang Lay Kee	EEE	Theory and modeling of the interactions between the energetic beam (electron, laser and electromagnetic pulse) and its surrounding structures
19	Huang Guangbin	EEE	Extreme Learning Machine; Computational intelligence theories; Machine learning applications in bioinformatics; Human-computer interface; Image processing; Robot control
20	Mao Kezhi	EEE	Computational Intelligence; Pattern Recognition; Medical Image Processing and Analysis; Bioinformatics
21	Narasimhan Sundararajan	EEE	Aerospace control; Neural networks; Parallel implementations of neural networks
22	Wang Lipo	EEE	Computational intelligence with applications to multimedia, Data mining, Bioinformatics, Optimization
23	Cai Yiyu	MAE	Bio-Informatics; Medical Informatics; Manufacturing Informatics; Computational Modeling Visualization; Virtual Reality
24	Damodaran Murali	MAE	Aerospace Engineering; Aerodynamics; Transonic Flows; Fluid Dynamics; Computational Fluid Dynamics (CFD); Aerodynamic Design Optimization and Aeroelasticity using CFD; High Performance Computing; Computational Science and Engineering
25	Meena Kishore Sakharkar	MAE	Computational biology; Bioinformatics; Eukaryotic Gene Structures; Gene Evolution; Functional Genomics; Comparative Genomics; Epitope Design; Biological Databases
26	Shu Jian Jun	MAE	Biological Mechanics; Nano and Micro Fluids; DNA Modelling; Red Tides
27	Liao Kin	SCBE	Mechanics of biomolecules and cells; Tissue engineering; Molecular simulation of living and nonliving systems; Nano - materials and nano – mechanics

28	Su Haibin	MSE	Development and application of theoretical and computational materials science; Quantum-mechanical; classical simulations and modeling of the electronic; structural, energetic and dynamical properties of functional materials
29	Kolatkar Prasanna Ratnakar (Adjunct)	GIS	Structural Biology; Bioinformatics; Structural informatics; Protein Protein interactions
30	Lipovich Leonard (Adjunct)	GIS	Integrated Computational and Experimental Genomics of High-Complexity Gene Structures; Gene Birth and Gene Death in Mammalian Genomes; Endogenous Cis-Antisense Transcription; Functional and Phenotypic Significance of Novel; Nonconserved and Noncoding-RNA Genes; Primate-Specific DNA Sequences and Computing the Basis of Human Uniqueness
31	Liu Jianjun (Adjunct)	GIS	Population; Genetic Pathways; Genetic Epidemiology; Molecular Genetic Study of Neurological and Psychiatric Disorders; Genetic dissection of inter-individual variation at cellular level
32	Tan Boon Ooi, Patrick (Adjunct)	GIS	Cancer and Pathogen Genomics; Systems Biology; Computational Biology
33	Wayne Mitchell (Adjunct)	GIS	Comparative Microbial Genomics; Bioinformatics; Parasitology & Infectious Disease; The RNA World
34	Li Jinyan (Adjunct)	I2R	Machine Learning; Data Mining; Emerging Patterns Bioinformatics (gene expression and proteomic profiling data analysis); Clinical Data Analysis; Decision Systems
35	Li Xiaoli (Adjunct)	I2R	Bioinformatics; Data Mining; Machine Learning; Web and Text Mining
36	Ng See Kiong (Adjunct)	I2R	Bioinformatics, Text Mining, Knowledge Discovery
37	Roy E. Welsch (Adjunct)	MIT	Computational and Systems Biology; Gene and Protein Microarray Analysis; Robust Statistical Analysis for Optical Imaging

b. AFFILIATES

No	Name	School	Research Expertise
1	Choi Koon Kau Byron	SCE	XML Storage; Main-Memory Query Processing; Data Transformations; Data Structures and Algorithms
2	Deepu Rajan	SCE	Image/Video Processing; Computer Vision; Medical Imaging; Image/Video Compression; Multimedia Signal Processing
3	Fong Cheuk Ming	SCE	Communications; Internet and Multimedia Technologies
4	Hsu Wen-Jing	SCE	Algorithms; Computer Architectures; Parallel and Distributed Systems; Networks
5	Lee Keok Kee	SCE	Computer Architecture; Parallel Disk System
6	Lim Ee Peng	SCE	Web Computing; Multi databases; Digital Libraries; Data Warehousing
7	Michel Pasquier	SCE	Artificial Intelligence; Soft Computing; Robotics and Automation; Software Engineering; Distributed Computing
8	Ng Wee Keong	SCE	Web Warehouse; Web Data Mining; Electronic Commerce; Software Agents; Internet/WWW Computing
9	Tay Leng Phuan, Alex	SCE	Computer Vision; Neural Networks; Genetic Algorithms; Autonomous Vehicle Navigation
10	Yow Kin Choong	SCE	Computer Vision; Human Computer Interaction; Bio-Medical Imaging
11	Curt Alexander Davey	SBS	DNA recognition in cellular regulation
12	Julien Lescar	SBS	Structural virology
13	Lun Kwok Chan	SBS	Biomedical informatics
14	Yoon Ho Sup, Joe	SBS	Molecular mechanism of signaling molecules in apoptosis through structural, biophysical, and biochemical studies
15	Chen Chung Kit, George	EEE	Thermal Conductivity Measurement and Modeling of Thin Film; Optical Design; Diffused Infrared Wireless Communication; Nano-scale imaging
16	Saman S. Abeysekera	EEE	Underwater Acoustic Communications & Signal Processing; Efficient Frequency Estimation techniques; Applications of time-frequency signal analysis in bio-medicine and audio processing; Synchronization aspects in Digital Communications; Sigma Delta Modulators and FPGA Implementations

17	Ma Yongsheng	MAE	CAD/CAM; Collaborative Intelligent Design; CIM; Engineering IT; Machine Tool Design
18	Ng Wan Sing	MAE	Medical Robotics; Computer Assisted Surgery
19	Ng Yin Kwee	MAE	Computational fluid dynamics in bio-heat transfer, microscale cooling and rotating machineries
20	Li Changming	SCBE	Bio/chemical array sensors; Biomems and drug delivery systems; Bioelectronics; Organic transistor and it applications; Portable fuel cells; Nanoelectrochemistry
21	Wang Kean	SCBE	Separation & purification processes with adsorption and membrane technologies; Synthesis, characterization, and modification of adsorbent materials; Modeling of mass transfer processes; Gas adsorption & storage; Molecular simulation; Chiral Separation
22	Chia Tet Fatt	NSSE	Molecular genetics

VIII. CURRENT RESEARCH STAFF

No	Name	Supervisor	Research Project
1	Cheng Jierong	Jagath C. Rajapakse	Data Mining & Microscopic Image Analysis
2	Duan Kaibo	Jagath C. Rajapakse	Computational Methods for Cancer classification with Proteomic
3	Ho Sy Loi	Jagath C. Rajapakse	Recognition of Translation Initiation Sites (TIS) and Alternate TIS (ATIS) in eukaryotes
4	Ma Jianmin	Jagath C. Rajapakse	Molecular evolution studies by codon usage and promoter analysis of MHC genes in mammals
5	Nguyen Ngoc Minh	Jagath C. Rajapakse	Protein Structures and Interactions Prediction
6	Pooja	Jagath C. Rajapakse	Comparison Genomics on the Grid
7	Zhou Juan	Jagath C. Rajapakse	Fusion of functional and structural MR images
8	Zheng Xuebin	Jagath C. Rajapakse	Modeling language system with functional MR imaging
9	Erwin Leonard	Sourav Bhowmick	Da Vinci's Notebook
10	Klarinda Gunadi W.	Sourav Bhowmick	Advanced Imaging Informatics Technologies
11	Wu Lin	Ang Lay Kee	First principle and multi-scale modeling of high current stable electron emission from carbon nanotube

12	Zhang Jian	Ang Lay Kee	Development of Quantum PIC Code
13	Zhang Peng	Ang Lay Kee	Coherent radiation sources and system

IX. POSTGRADUATE STUDENTS

a. PHD STUDENTS

No	Name	Supervisor	Research Project
1	Zhou Deyu	Asst/P He Yulan	Extraction of protein and gene interactions from the MEDLINE database
2	Arun Kumar	Jagath C. Rajapakse	fMRI Signal Analysis
3	Iti Chaturvedi	Jagath C. Rajapakse	Gene Regulatory & Protein Interaction Networks
4	Kavuri Swathi	Jagath C. Rajapakse	ICA-R
5	Lee Seow Eng	Jagath C. Rajapakse	Analysis of Gene Expression time-series using GA to infer Gene Regulatory Networks
6	Liu Song	Jagath C. Rajapakse	Analysis of cellular images
7	Merlin Veronika	Jagath C. Rajapakse	Cell cycle and gene regulatory network modeling
8	Mundra Piyushkumar	Jagath C. Rajapakse	Gene Expression Data Analysis
9	Nai Hong Hwa Francis	Jagath C. Rajapakse	Highly accurate & fast novel docking algorithms
10	Ng Yu-Jin Alvin	Jagath C. Rajapakse	Modeling spatial dynamics of cytoskeletal systems
11	Zheng Bo	Jagath C. Rajapakse	Functional Imaging
12	Adrianto Wirawan	Kwoh Chee Keong	Whole Genome Discovery of Transcriptional Regulatory
13	Cheong Lee Sing	Lin Feng	Structural Analysis of Genomic Sequences Using Digital Signal Processing Technology
14	Zhu Zexuan	Ong Yew Soon	Soft Computing for Bio-Data-Mining
15	Lakhsmi V.	Sourav Bhowmick	Mathematical Predictive Model of Transforming Growth Factor-Beta Activation and Resolution

16	Seah Boon Siew	Sourav Bhowmick	Ontology-conscious BioImaging Data Management
17	Yu Renjun	Tan Eng Chong	Biomedical signal processing based on TFD analysis
18	Pang Chee Hwa	Ang Lay Kee	JC2 Law in open drict tube
19	William Chandra	Ang Lay Kee	First Principle Simulation on GOX BD
20	Xiao Shi	Xiao Gaoxi	Attack, protection and decentralised search in complex systems

b. MENG STUDENT

1	Maria Stepanova	Lin Feng	In Silico Modeling of Hormone-Regulated Gene Expression Network

X. EXTERNAL RESEARCH FUNDING

Research Value (S$)	Sponsor	Title	PI(s)	Start / end dates
$80,000	CoE at NTU	Start Up Grant	Su Haibin	2006
$316,000	A*STAR	Spintronics based on tunable highly spin polarized systems	Co-PI: Su Haibin	Oct 2006
$50,000	STMicroelectronics Pte Ltd	Speech Recognition on SpeechDat-Car Database	He Yulan	Mar 2005 - Mar 2007
$285,000	AcRF SBS	Start-up grant	Christian Schönbach	2006
$50,000	Centre of Signal Processing	Development of Photothermal Imaging System	George Chung Kit Chen	May 2005 – May 2007
US$25,000	USA-AFOSR	Quantum theory of collective electron-structure interaction in vacuum nano-electronics,	Ang Lay Kee	Jun 2006 - Jun 2007
$90,000	NTU RGM5/05	Analysis and Development of free-electron based compact coherent THz source	Ang Lay Kee	Dec 2005 - Dec 2008
$550,0000	ASTAR, SERC, NTU RG100/05	High current carbon nanotube cathode for miniature high power terahertz source applications	Ang Lay Kee	Jan 2005 – Jan 2008

$2.32 million with cash contribution of $470,000	NTU-Atomistix	Bridging Bottom-up Atomic Models with Top-down Compact Modeling for Future Generation Nanoelectronics Circuit Simulation	Co-PI: Ang Lay Kee PI: Zhou Xing	Feb 2006 – Jan 2009.
$223,000	SMA2-CSB program	Advanced Analysis of Cellular Images	Jagath Rajapakse/ Roy E. Welsch, MIT, USA	Aug 2005 – Aug 2008
$143,200	A*Star BMRC Grant through National Grid Office	Grid-based comparative genomic pipeline for detecting conserved non-coding functional regions	Jagath C. Rajapakse (PI), Miao Chun Yan, Vivek Gopalkrishnan, Yang Zhonghua	Sep 2005 – Sep 2007
$140,000	RGM 7/05 Academic Research Fund, Ministry of Education, Singapore	Grid-based comparative genomics	Jagath Rajapakse	Dec 2005 – Dec 2007
$850,000	Inter-University (IU) project grant, Singapore-MIT Alliance – Computational and Systems Biology program	Advanced image informatics	Sourav Bhowmick / Forbes Dewey Jr., MIT	Aug 2005 – Aug 2008
$780,000	SERC/A*STAR	Bio Visualization and Bio Virtual Reality	Cai Yiyu	Apr 2002 – Mar 2006
$50,000 $21,000	Singapore Bio-imaging Consortium & SEP/NTU	3D Cellular Confocal Image Processing	Cai Yiyu	Jan 2006 - Dec 2007
$92,000	Ministry of Education, Academic Research Fund	Dynamically Adaptable Neurocomputer and Its Application to Recognition of Steroid Hormone Response Elements	Lin Feng	2006-2008

XI. AWARDS

a. STAFF AWARDS

No.	Staff	Awards
1	Su Haibin	Marquis ***Who's Who*** in Science and Engineering, Edition 2006-2007.
2	Jagath C. Rajapakse	*Guest Editor,* Special Issue in Computational Intelligence in Bioinformatics and Computational Biology, IEEE Transactions on Computational Biology and Bioinformatics (Issue to appear in early 2007)
3	Jagath C. Rajapakse	*Chair*, IAPR Technical Committee (TC-20) on Pattern Recognition for Bioinformatics
4	Jagath C. Rajapakse	*Associate Editor*, IEEE Transactions on Computational Biology and Bioinformatics
5	Jagath C. Rajapakse	*Marquis Who's Who in Medicine and Healthcare*
6	Jagath C. Rajapakse	*Most cited scientist in psychology/psychiatry*, 1996 - 2006 *Most cited scientist in all fields in past decade*, 1996 - 2006 Thompson ISI Essential Science Indicators
7	Jagath C. Rajapakse	Asian/American Who's Who, 2003 onwards
8	Jagath C. Rajapakse	Who's Who in American Education, 2003 onwards
9	Jagath C. Rajapakse	*Visiting Professor*, Biological Engineering Division, Massachusetts of Technology (MIT)
10	Ang Lay Kee	*Visiting Scientist*, Los Alamos National Laboratory, Mexico (2003-2007)
11	Ang Lay Kee	*Visiting Scientist,* University of Michigan, USA (2007)
12	Wong Lim Soon	2003 FEER Asian Innovation Gold Award

b. STUDENT AWARDS

No.	Student / Supervisor	Awards
1	Arun Kumar / Jagath C. Rajapakse	Runner-up for the best student paper award, 13th International Conference on Neural Information Processing (ICONIP 2006)
2	Yang Xiao / Jagath C. Rajapakse	Nominee for the Best Paper Award, International Conference of Genomic Informatics (GIW2004), Yokohama, Dec. 2004
3	Ho Sy Loi / Jagath C. Rajapakse	Best Overall Paper Award, IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology, San Diego, Oct 2004
4	Ho Sy Loi / Jagath C. Rajapakse	Best Student Paper Award, IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology, San Diego, Oct 2004
5	Ho Sy Loi / Jagath C. Rajapakse	50,000 yen by Japanese Bioinformatics Society for the work presented at GIW2003 Splice site detection with a higher-order Markov model implemented on a neural network.
6	Minh Nguyen Ngoc / Jagath C. Rajapakse	50,000 yen by Japanese Bioinformatics Society for the work presented at GIW2003: Multi-class Support Vector Machines for Protein Secondary Structure Prediction.
7	Guan Yunqing / Cai Yiyu	Awarded the 2006 Andrew Fraser Prize from the Institution of Engineers of Singapore.
8	Wong Chia Sern / Lin Feng	Industrial Attachment student working on Advanced Planning and Decision System and Multiple Path Finder, won the Silver Award at the DSTA Best Projects Competition, 2005.

XII. PRESTIGE

a. PROFESSIONAL ACTIVITIES

No.	Title	Staff Name	Organization
1	Steering Committee	Jagath C. Rajapakse	European Conference on Evolutionary Computations and Machine Learning in Biology (EvoBIO), (April 2005 - present)
2	Committee Member	Jagath C. Rajapakse	IEEE Singapore Chapter, Engineering in Medicine and Biology Society, 2004 – present.
3	Technical Committee	Jagath C. Rajapakse	Bioinformatics and Bioengineering (BBTC), IEEE Computational Intelligence Society, Nov. 2004 – present.
4	Vice Chair, Technical Committee	Jagath C. Rajapakse	Pattern Recognition for Bioinformatics, International Association of Pattern Recognition (IAPR), Nov. 2004 – Nov. 2006.

No.	Title	Staff Name	Organization
5	Senior Member	Jagath C. Rajapakse	Institute of Electrical and Electronic Engineers (IEEE)
6	Governing Board Member	Jagath C. Rajapakse	Asia Pacific Neural Network Assembly (APNNA)
7	Technical Committee on Neural Networks	Jagath C. Rajapakse	The International Association of Science and Technology for Development (IASTED) (2003 - 2006)
8	International Advisory Board	Jagath C. Rajapakse	Knowledge Engineering and Discovery Research Institute, Auckland University of Technology
9	Steering Committee	Jagath C. Rajapakse	Independent Component Analysis (ICA) Conferences
10	Management Committee	Wong Lim Soon	National University of Singapore Institute of Engineering Science (2004-2005)
11	Committee Member	Wong Lim Soon	Tan Kah Kee-DSTA Defense Science Award Committee (2003)
12	Board of Directors	Wong Lim Soon	Association of Asian Societies for Bioinformatics (2003)
13	Board of directors	Wong Lim Soon	Molecular Connections, Bangalore, India
14	SAB	Wong Lim Soon	geneticXchange inc, California, USA
15	Chairman	Wong Lim Soon	A*STAR Tech Scan Panel on Information Management
16	Member	Salil K Bose	New York Academy of Sciences
17	Coordinator	Lars Nordenskiold	25% joint appointment with Division of Bioengineering, coordinator for SBS teaching in the Bioengineering course, 2004
18	Member	Lars Nordenskiold	NTU Working Group on Quality Assurance in Teaching, 2003
19	Senior Member	Huang Guangbin	Institute of Electrical and Electronic Engineers (IEEE)
20	Member	Liu Jianjun	Domain-Specific Review Board C, National Health Group, Singapore
21	Member	Liu Jianjun	Peripheral, Central, Sensory & Cellular Nervous System/Mental Health Subcommittee, National Medical Research Council, Singapore

b. CONFERENCE ACTIVITIES

No.	Title	Staff Name	Activity
1	General Co-Chair	Jagath C. Rajapakse	IEEE Symposium on Bioinformatics and Computational Biology (CBB) Honolulu, Hawaii, April, 2007.
2	Program Co-Chair	Jagath C. Rajapakse	First International Workshop on Pattern Recognition in Bioinformatics (PRIB'06), Hong Kong, August 2006.
3	Program Co-Chair	Jagath C. Rajapakse	Fourth European Workshop on Evolutionary Computation in Bioinformatics (EvoBio'07), Valencia, Spain, April 10 – 12, 2007.
4	Publicity Co-Chair	Jagath C. Rajapakse	IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology, San Diego, November, 2005
5	Advisory Committee	Jagath C. Rajapakse	12th International Conference on Neural Information Processing ICONIP2005, Taipei, Taiwan, November 2005.
6	Regional Chair	Ng See Kiong	BIOINFO2005 (a joint event comprising INCOB2005, AASBi2005 and KSBi2005) in Busan, South Korea, September 22-24, 2005.
7	Best Paper Judge	Ng See Kiong	15th International Conference on Genome Informatics (GIW-2004), Yokohama, Japan, December 13-15, 2004.
8	Track chair	Huang Guangbin	The 5th International Conference on Information, Communications and Signal Processing (ICICS 2005), Bangkok, Thailand, 6-9 December, 2005
9	Scientific Committee	Shu Jian Jun	The 1st International Conference "From Scientific Computing to Computational Engineering" Athens, Greece (8 – 10 September 2004)

c. EDITORIAL SERVICES

No.	Title	Staff Name	Activity
1	Associate Editor	Jagath C. Rajapakse	IEEE Transactions on Computational Biology and Bioinformatics
2	Guest Co-Editor	Jagath C. Rajapakse	Special Issue on "Computational Intelligence Approaches in Computational Biology and Bioinformatics", IEEE Transactions on Computational Biology and Bioinformatics
3	Guest Co-Editor	Jagath C. Rajapakse	Special Issue on "Softcomputing in Bioinformatics and Medical Informatics", Softcomputing, Springer (to appear in late 2005)
4	Editorial Board Member	Jagath C. Rajapakse	International Journal of Computational Intelligence
5	Editorial Board Member	Jagath C. Rajapakse	Neural Information Processing - Letters and Reviews
6	Guest Editor	Sourav Bhowmick	Special Issue, Data and Knowledge Engineering Journal, Elsevier Science
7	Associate Editor	Wang Lipo	IEEE Transactions on Neural Networks
8	Editorial Board Member	Wang Lipo	Soft Computing
9	Associate Editor	Wang Lipo	IEEE Transactions on Evolutionary Computation, 2003
10	Editorial Board Member	Wang Lipo	Neural Information Processing – Letters and Reviews, 2003
11	Associate Editor	Lars Nordenskiold	Biophysical reviews and Letters
12	Series Editor	Wong Lim Soon	Advances in Bioinformatics & Computational Biology (book series) (2004)
13	Editor	Wong Lim Soon	International Journal of Information Technology
14	Managing Editor	Wong Lim Soon	Journal of Bioinformatics & Computational Biology
15	Advisor	Salil K. Bose	Editorial Board of Journal of Biology Education, UK
16	Associate Editor	Ng See Kiong	Advances in Bioinformatics and Computational Biology" (ABCB) book series, Imperial College Press, London, 2004.

d. INVITED TALKS

1	**Schönbach C**., "The RIKEN mouse transcriptome: lessons learned and implications for the regulation of immune reactions", *Novartis Symposium NF281 Decoding the genomic control of immune reactions,* Canberra, Australia, Mar 7-9, 2006
2	**Schönbach C.**, "Canonical and Non-canonical Mechanisms in Generating Protein Diversity", *European Inaugural of the International PostGenetics Society at the International Congress of Immunogenomics and Immunomics*, Budapest, Hungary, Oct 8-12, 2006
3	**Jagath C. Rajapakse,** "Neural systems modeling with functional MRI with Bayesian networks," A*Star TSRP Workshop on Cognitive Systems, Singapore, February 15, 2006
4	**Jagath C. Rajapakse, "**Exploratory analysis of effective brain connectivity from functional MRI", Neuropediatric Unit, Department of Women and Health Care, Karolinska Institute, Stockholm, Sweden, May 8, 2006
5	**Jagath C. Rajapakse, "**Exploratory analysis of effective brain connectivity from functional MRI", Department of Medical Physics, University of Freiburg, Freiburg, Germany, June 8, 2006
6	**Jagath C. Rajapakse, "**Exploratory analysis of brain connectivity from functional MR images", Singapore Bioimaging Consortium Workshop 2006. Aug 8, 2006
7	**Ang Lay Kee,** Quantum Vacuum Nanoelectronics organized by Air Force Office of Scientific Research (AFOSR), USA in Virginia on Sept 13, 2006.
8	**Jagath C. Rajapakse,** "Neural systems biology", Workshop on Artificial Neural Networks, Bioinformatics, and Neuroinformatics – A Synergistic Approach, International Joint Conference on Neural Networks (IJCNN), Montreal, August 4, 2005
9	**Jagath C. Rajapakse,** "Two-stage support vector machines for protein solvent accessibility prediction," Academia Sinica, Taipei, Nov 7, 2005
10	**Cai Yiyu,** "Virtual Reality Fluorescent Histochemistry", Focus on Imaging Workshop, Organized by the HSC and Canadian Health Institute of Research, Toronto, Canada, Nov. 15, 2005.
11	**Ang Lay Kee,** the 47th Annual Meeting of the American Physical Society-Division of Plasma Physics (APS-DPP) in Colorado, USA, October 24-28, 2005.
12	**Jagath C. Rajapakse,** "Computational approaches to signal detection in genomic sequences", KIT Bioinformatics Symposium, Kyushu Institute of Technology, Fukuoka, Japan, December 11, 2004

XIII. POSTGRADUATE STUDENTS COMPLETED

a. Ph.D AWARDED

No	Name	Supervisor	Year Graduated
1	Zhou Juan	Jagath C. Rajapakse	2006
2	Zheng Xuebin	Jagath C. Rajapakse	2006
3	Zheng Yun	Kwoh Chee Keong	2006
4	Chen Ling	Sourav Bhowmick	2006
5	Erwin Leonardi	Sourav Bhowmick	2006
6	Zhao Qiankun	Sourav Bhowmick	2006
7	Yu Renjun	Tan Eng Chong	2006
8	Cheng Yuhua	Lars Nordenskiold	2006
9	Zhou Xin	Mao Kezhi	2006
10	Jia Hui	Li Jinming	2006
11	Zhang Runxuan	Narasimhan Sundararajan	2006
12	Nguyen Ngoc Minh	Jagath C. Rajapakse	2005
13	Ho Sy Loi	Jagath C. Rajapakse	2005
14	Qi Yutao	Lin Feng	2005
15	Shen Li	Tan Eng Chong	2005
16	Chen Jinmiao	Shivaji Chaudhari	2005
17	Palasingam Paaventhan	Prasanna Kolatkar	2005
18	R. G. N. Meegama	Jagath C. Rajapakse	2004
19	Tan Choong Leong	Jagath C. Rajapakse	2004
20	Lu Wei	Jagath C. Rajapakse	2003

b. MEng AWARDED

No	Name	Supervisor	Year Graduated
1	Yang Kanyan	Jagath C. Rajapakse	2005
2	Yan Rian	Lin Feng	2005
3	Feng Yuan	Ng See Kiong	2005
4	For Wei Khing	Ng See Kiong	2005
5	Sandeep Prakasash	Sourav Bhowmick	2005
6	Jia Yiyu	Kwoh Chee Keong	2004
7	Zhao Ying	Kwoh Chee Keong	2004
8	V. Venkatraman	Jagath C. Rajapakse	2003
9	H. P. Ong	Jagath C. Rajapakse	2003
10	Denis A. Shestakov	Sourav Bhowmick	2003

XIV. PUBLICATIONS

a. JOURNALS

1 J. Zhou and **J. C. Rajapakse**, "Contextual modeling of brain activation on subcortical structures using a fuzzy framework," *Neurocomputing* (accepted)

2 C. Chen and **J. C. Rajapakse**, "Grid-enabled BLASTZ: applications to comparative genomics," *Journal of VLSI Signal Processing Systems for Signal, Image, and Video Technology*, (accepted)

3 A. Kumar and **J. C. Rajapakse**, "Detection of activation in functional MR experiments based on power spectral density and HMM," *Neural Computing and Applications* (accepted)

4 J. Zhou and **J. C. Rajapakse**, "Modeling hemodynamic variability using fuzzy features for detecting brain activation from fMR time-series," *Neural Computing and Applications* (accepted)

5 M. N. Nguyen and **J. C. Rajapakse**, "Two stage support vector machines for protein secondary structure prediction," *International Journal of Data Mining and Bioinformatics*, Vol. 1, No. 3, January 2007, pp. 248-269

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8 **H.B. Su**, William A. Goddard, III, and Y. Zhao, "Dynamic friction force in a carbon peapod oscillator", *Nanotechnology 17*, 5691 (2006)

9 Z.F.Wang, Qunxiang Li, **H.B. Su**, Xiaoping Wang, Q.W.Shi, Jie Chen, J.L. Yang, and J.G.Hou "*Electronic Structure of Bilayer Graphene: A Real-space Green's Function Study", Phys. Rev. B 75* (cond-mat/0612483)

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12 **Y. He** and S.J. Young, "Spoken Language Understanding using the Hidden Vector State Model", *Speech Communication Special Issue on Spoken Language Understanding for Conversational Systems*, Vol. 48, No. 3-4, pp. 262-275, 2006.

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14 Bajic V, Tan SL, Christoffels A, **C. Schönbach***, Lipovich L, Yang L, Hofmann O, Kruger A, Winston H, Kai C, Kawai J, Hume D, Carninci P, Hayashizaki Y., "Mice and man: Their promoter properties", *PloS Genetics* 2(4):e54, 2006.

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c. BOOKS

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XV. PATENTS AND COMMERCIAL PRODUCTS

No.	Staff Name	Patents
1	Christian Schönbach	A pharmaceutical composition for treating and diagnosing a disorder associated with peroxisomal biogenesis and function. WO2006/132445 A2, World Intellectual Property Organization.
2	Fong Cheuk Ming	International patents filed by the Motorola IP Law Department in 1999-2000 for innovations incorporated into our Mobilepad ^{TM} range of handheld wireless communication products.
3	Prasanna Kolatkar	The use of a fungal immunomodulatory protein, Fve, for immunotherapy, against allergy, virus infection and cancer.

No.	Staff Name	Commercial Products
1	Sourav Bhowmick	Research in biological data integration has been adopted and implemented in the commercial product gRNA now marketed by Genvea BioSciences, Singapore (previously marketed by HeliXense Pte Ltd, Singapore)

XVI. ROLE MODEL OF BIRC

European Bioinformatics Institute (EBI)
Focus areas: Sequence databases, pathways, annotation, functional genomics, molecular evolution, structural biology, transcription and translation analysis, computational neurobiology, high performance computing for bioinformatics, biological databases

Over 300 staff members, premier bioinformatics research institute in Europe, primary aim is to develop tools and databases to facilitate bioinformatics researchers around the world.

BIRC could be considered as a small scale of EBI and covers most research areas of EBI, perhaps more, but focuses only in niche projects. BIRC research is more basic and often leads to Graduate thesis and journal papers. Unlike EBI, BIRC does not put much emphasis on providing services to bioinformatics research community at large. Though small and with short history, BIRC researchers has been able to publish its research in same international journals as EBI researchers do. In other words, the research quality is as same. BIRC has the know-how and critical mass to perform research at the same caliber of EBI and could do at the same level or even better with increasing student/researcher strength and additional funding.

Computational Biology Centre (CBC) at IBM T. J. Watson Research Labs
The center views bioinformatics and computational biology as a hybrid of biology, medicine, and computer science. It focuses upon work in pattern recognition, simulation science, databases, knowledge discovery, data mining, and statistics and information theory.

Current focus areas: systems ranging from single protein molecules through to complex molecular interactions, interpretation and reverse-engineering of complex disease-lifestyle-genomic interactions, Blue Gene petaflop computing initiative, medical informatics, computer-and-genomics-based personalized medicine.

IBM CBC involves in very focus areas, mainly in computational nature, and the methodologies are then efficiently implemented in high performance computing. CBC and BIRC publish research finding in same journals and the qualities of research are in par. IBM Watson centre is well established in many areas and CBC researchers are better experienced. BIRC covers a broader area of bioinformatics.

BIRC
The quality BIRC research is at par with that of research carried out at both EBI and CBC. PIs at both EBI and CBC are full-time researchers and research staff numbers are much bigger. BIRC on the other hand selects only niche topics in focus areas and involves in small scale projects.

XVII. METRICS FOR THE NEXT REVIEW PERIOD

Strategic areas
Systems biology of human diseases through development of pathways using gene regulatory networks and protein-protein interactions.
Immune systems and drug targets for infectious disease.
Neural systems biology.
Molecular image informatics.
Drug discovery through comparative genomic analysis.

Other upgrades
There is a need to bring instruments that does not need much of wet-lab expertise: electron microscopy, micro-array and sequence facility, EEG imaging.
There is a need to upgrade the existing high performance computing servers.

Sustainability of the center
Naturally the emergence of bioinformatics is of critical importance due to huge volume of data flooding from biology from various experiments and literature. It is inherently multi-disciplinary with important applications in medicine, agriculture, chemistry, and nanotechnology. BIRC provides the necessary environment and facility for NTU faculty/students/researchers to engage in cutting and leading edge bioinformatics research and facilitates collaboration within Singapore, and world-renown researchers. Hence its sustainability is of paramount importance to NTU. Thus far, except for initial seed funding, there has not been direct funding for BIRC research. BIRC plans to tap on funding schemes such as NRF for funding to keep its research flourishing.

It is also necessary to have a long term commitment of funding so that good staff can be retained at BIRC to continue to perform its research.

Bioinformatics tends to grow in the coming decade because of the pouring of post-genomic life sciences data and the need of computational biologists to analyze and interpret such data. The personalized medicine best requires every individual genome sequenced and hence the need for computational biologists grow though the directions could change with the new findings.

Impact
BIRC research is internationally competent and up-to-date. BIRC publications have appeared in top high-impact journals. Some of its researchers are known internationally.

Level of activities
BIRC founded and currently runs IAPR TC-20 and PRIB conference series. This will continue for next couple of years until international steering committees for the TC-20 and PRIB are formed. BIRC will maintain its international exposure through IAPR TC-20 and PRIB. It will also involve in hosting other conferences too and plans to host short focus workshops with its collaborators and partners.

Formal collaboration to be established
Swiss Institute of Bioinformatics on plant protein annotation.
MIT Centre for Cancer Research, National Cancer Institute on cancer systems biology.
Center for Molecular Medicine, Singapore, and Whitehead Institute, MIT, on tissue image informatics.

Income generation
There is a need to get funding to sustain its activities. Forming interest groups and large scale projects and tapping in to funds available for local sources, such as NRF, as well as international pools are in the pipeline.

XVIII. INTERNATIONAL REFEREES

Professor Sun-Yuan Kung
Professor of Electrical Engineering, Princeton University.
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Professor S.Y. Kung received his Ph.D. Degree in Electrical Engineering from Stanford University in 1977. In 1974, he was an Associate Engineer of Amdahl Corporation, Sunnyvale, CA. From 1977 to 1987, he was a Professor of Electrical Engineering-Systems of the University of Southern California, L.A. Since 1987, he has been a Professor of Electrical Engineering at the Princeton University. In addition, he held a Visiting Professorship at the Stanford University (1984); and a Visiting Professorship at the Delft University of Technology (1984); a Toshiba Chair Professorship at the Waseda University, Japan (1984); an Honorary Professorship at the Central China University of Science and Technology (1994); and a Distinguished Chair Professorship at the Hong Kong Polytechnic University since 2001. His research interests include VLSI array processors, system modelling and identification, neural networks, wireless communication, sensor array processing, multimedia signal processing, bioinformatic data mining and biometric authentication.

Professor Kung has authored more than 400 technical publications and numereous textbooks, Professor Kung has co-authored more than 400 technical publications and numerous textbooks including "VLSI and Modern Signal Processing," with Russian translation, Prentice-Hall (1985), “VLSI Array Processors", with Russian and Chinese translations, Prentice-Hall (1988); “Digital Neural Networks", Prentice-Hall (1993); “Principal Component Neural Networks", John-Wiley (1996); and “Biometric Authentication: A Machine Learning Approach", Prentice-Hall (2004).

Professor Kung is a *Fellow of IEEE* since 1988. He served as a Member of the Board of Governors of the IEEE Signal Processing Society (1989-1991). He was a founding member of several Technical Committees (TC) of the IEEE Signal Processing Society, including VLSI Signal Processing TC (1984), Neural Networks for Signal Processing TC (1991) and Multimedia Signal Processing TC (1998), and was appointed as the first Associate Editor in VLSI Area (1984) and later the first Associate Editor in Neural Network (1991) for the IEEE Transactions on Signal Processing. He presently serves on Technical Committees on Multimedia Signal Processing. Since 1990, he has been the *Editor-In-Chief* of the Journal of VLSI Signal Processing Systems.

Professor Kung was a recipient of IEEE Signal Processing Society's *Technical Achievement Award* for his contributions on "parallel processing and neural network algorithms for signal processing" (1992); a *Distinguished Lecturer* of IEEE Signal Processing Society (1994); a recipient of IEEE Signal Processing Society's *Best Paper Award* for his publication on principal component neural networks (1996); and a recipient of the *IEEE Third Millennium Medal* (2000).

Professor Raj Acharya
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Professor Raj Acharya obtained his Ph.D from the Mayo Graduate School of Medicine/University of Minnesota in 1984. Since then, he has worked as a Research Scientist at Mayo Clinic and at GE (Thompson)-CGR in Paris, France. He has also been a Faculty Fellow at the Night Vision Laboratory in Fort Belvoir in Washington D.C. and has been a NASA-ASEE Faculty Fellow at the Johnson Space Center in Houston, Texas. He was the chair of the department of Computer Science and Engineering at SUNY-Buffalo from Fall 1999 till Spring 2001. He is currently the department head of Computer Science and Engineering at the Pennsylvania State University and the director of the Advanced Laboratory for Information Systems & Analysis.

He has been the Chair of Special Sessions in the IEEE International Conference on Multimedia and Expo (July-August, 2000). He is on the editorial board of the International Journal of Computerized Medical Imaging and Graphics. He has been a panel member of the National Institute of Health, BioImaging study section. He was on the scientific board of the IEEE Model Based 3D Biomedical Image Analysis. He was the Session Chair at the 1996 International SPIE Symposium. He was General Chair of 1994 SPIE International Conference on Physiology and Function from Multidimensional Images. He was also Co-Chair of 1994 IEEE Workshop in Biomedical Image Analysis. He was General Chair of SPIE Conference on Biomedical Image Processing (1992 and 1993).

His research work has been featured among others in *Businessweek, Mathematics Calendar, The Scientist, Diagnostic Imaging and Biomedical Engineering Newsletter* and *Drug Discovery.*

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Dr. Jacek M. Zurada received his MS and PhD degrees (with distinction) in electrical engineering from the Technical University of Gdansk, Poland in 1968 and 1975, respectively. Since 1989 he has been a Professor, and since 1993 a distinguished Samuel T. Fife Professor with the Electrical and Computer Engineering Department at the University of Louisville, Kentucky. He was Department Chair from 2004 to 2006.

He has published 280 journal and conference papers in the areas of neural networks, Northeastern, Auburn, and at foreign universities in Australia, Chile, China, France, Germany, Hong Kong, Italy, Japan, Poland, Singapore, Spain, South Africa and Taiwan. He has delivered numerous invited and plenary conference presentations and seminars throughout the world.

Dr. Zurada was an Associate Editor of IEEE Transactions on Circuits and Systems, Part I and Part II, and served on the Editorial Board of the Proceedings of IEEE. From 1998 to 2003 he was the Editor-in-Chief of IEEE Transactions on Neural Networks. He is an

Associate Editor of Neurocomputing, Schedae Informaticae, International Journal of Applied Mathematics and Computer Science, Advisory Editor of International Journal of Information Technology and Intelligent Computing, and Editor of Springer Natural Computing Book Series.

He has served the profession and the IEEE in various elected capacities, including as President of IEEE Computational Intelligence Society in 2004-05. He has been member and Chair of various IEEE CIS and IEEE TAB committees, including the IEEE TAB Periodicals Committee and IEEE TAB Periodicals Review Committee. He was Chair of the Plenary Symposium on Critical and Emerging Issues in Computational Intelligence held at the IEEE WCCI in Orlando, Florida, and was the Founding Chair of the NNC Neural Networks Technical Committee.

Dr. Zurada has received a number of awards for distinction in research, teaching, and service. In addition to several best paper awards, his honors include the 1993 Presidential Award for Research, Scholarship and Creative Activity, 1997 Polish Ministry of National Education Award, 1999 IEEE Circuits and Systems Society Golden Jubilee Medal, and the 2001 Presidential Distinguished Service Award for Service to the Profession. He is a Distinguished Speaker of IEEE CIS and IEEE Fellow.

In 2003 he was conferred the Title of National Professor by the President of Poland. In 2004 and 2006, respectively, he received Honorary Professorships from Hebei University, and from the University of Electronic Science and Technology of China, Chengdu, both in China. Since 2005 he is a Member of the Polish Academy of Sciences, and serves as a Senior Fulbright Specialist in 2006-11.

Professor Nikola Kasabov
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Professor Nikola Kasabov is the Foundation Director of KEDRI, and a Chair of Knowledge Engineering at the School of Computer and Information Sciences at AUT, Fellow of the Royal Society of New Zealand, Fellow of the New Zealand Computer Society and a Senior Member of IEEE. He holds a MSc and PhD from the Technical University of Sofia. His main research interests are in the areas of: intelligent information systems, soft computing, neuro-computing, bioinformatics, brain study, speech and image processing, data mining and knowledge discovery.

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Professor Xin Yao is a professor of computer science in the School of Computer Science at the University of Birmingham and the Director of the Centre of Excellence for Research in Computational Intelligence and Applications (CERCIA). He is also a Fellow of IEEE, a Distinguished Lecturer of the IEEE Computational Intelligence Society, and a Distinguished Visiting Professor of University of Science and Technology of China, Hefei, China.
He is the Editor-in-Chief of the IEEE Transactions on Evolutionary Computation. His research interests include evolutionary computation (evolutionary optimization,

evolutionary learning, evolutionary design), neural network ensembles and multiple classifiers (especially on the diversity issue), meta-heuristic algorithms, data mining, computational complexity of evolutionary algorithms, and various real-world applications.

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Prof. Ernest Feytmans graduated in cell biology and in statistics at the Catholic University of Louvain, Belgium. He received his PhD in 1973 for a thesis with Jacques Berthet and Christian de Duve and was a postdoctoral fellow with Christian de Duve at the Rockefeller University. He was professor at the Catholic University of Santiago, Chile until 1975 and then at Namur University, Belgium, where he headed the Department of Biology and the Unit of Structural Molecular Biology. From 1982 to 1987 he was Chancellor and from 1991 to 1997 Dean of the Faculty of Sciences. In 1997 he became Dean of the Faculty of Medical Sciences and Head of the Biochemistry Unit at the University of the West Indies. Lately his research interests focus on the prediction of protein 3D-structures using atomic mean force potentials. In 2001, he was appointed Director of the Swiss Institute of Bioinformatics. He participated to the creation of the Bioinformatics core facility at ISREC and is now collaborating with it.