

## Personal Details

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## Academic Qualifications

- Excellent Teacher, Uppsala University, Sweden, 2013.
- Associate Professor, Uppsala University, Sweden, 2011.
- Doctor of Philosophy ( Computer Science ) La Trobe University, Melbourne Australia, 1994.
- Bachelor of Science (Hons) (Major - Computer Science) La Trobe University, Melbourne, Australia, 1987.

## Other Relevant Skills

- Read and speak basic French.
- Read write and speak good Swedish
- Read write and speak fluent English (native language)

## Employment Profile

**2012** Appointed "excellent teacher", Uppsala University.

**2011** Docent/Associate Professor in Computing Education Research.

**July 2000 - present** Senior Lecturer, Department of Computer Systems, Uppsala University, Uppsala, Sweden

Duties:

**2013-2016** Member of Boards of Studies for Technology and Natural Science, Uppsala University.

**2009-2011,2012-2014** Elected member of the Academic Senate of Uppsala University

**2004-present** Director CeTUSS National Center for Student Relevant Engineering Education

**2007-2010** Chairman of "Programrdet fr profilutbildning"

**2007-2010** Member of the Boards of studies of Natural Sciences and Technology

**200** Directed Wallenberg Global Learning Network (WGLN) project "Wireless Learning".

**2001-2002** Directed WGLN project "Scalable Learning Environments", 2001 and 2002.

**1991-present** Undergraduate teaching

**July 1999 - June 2000** Visiting Lecturer, Department of Computer Systems, Uppsala University, Uppsala, Sweden

Duties:

- Student Instruction, Networks, Real-Time and Distributed Systems and Parallel Computer Architecture.
- International collaborative learning research, Runestone Project (Project Director: Mats Daniels)

**1999-2000** Tenured Senior Lecturer, La Trobe University, Melbourne, Australia

**1991-1998** Tenured Lecturer, La Trobe University, Melbourne, Australia

Duties:

- Instruction of first year, full time diploma, and third and fourth year students.
- Research supervision of Honours and Masters students.
- Convener of the Departmental Committee on Teaching Quality and Standards
- Advisor of Studies Department's fixed enrollment degree programmes
- 3rd year coordinator

**1987-1990** Tutor and Laboratory Demonstrator (La Trobe University)

Duties:

- Tutorials instruction
- Development of laboratory material for a course in C programming
- Occasional lecturing

**1987** Research Assistant (La Trobe University, Concurrency Research Group) Development of a concurrent architecture simulator "THREADS" in 'C'.

**1986** C.S.I.R.O. D.I.T Melbourne Research Scholarship

- Design and implementation of a section of the CCITT X.400 Interpersonal Mail System on an Apple Macintosh.
- Project director Dr Ian Richards.

## List of Prizes, Fellowships and Honours

- IEEE Computer Society Golden Core Member, 2012
- IEEE/ASEE Frontiers in Education Outstanding Service Award, 2011
- Pedagogiska Priset 2008, Uppsala University, Sweden
- ITP Teaching Prize 2001, Uppsala University, Sweden
- French Ministry of Foreign Affairs Research Fellowship 1998
- Mendel Medal (Foreign Paper Prize)(Mendel Int Conf on Genetic Algs 1996)
- French Ministry of Foreign Affairs Research Fellowship 1995
- Sigma Data (Industry Study Bursary) 1988-1990

- Commonwealth Postgraduate Scholarship 1988-1990
- D.M Myers University Medal: School of Mathematics and Information Sciences 1986
- Fourth Year I.B.M Prize 1986
- Third Year School Prize for Computer Science 1985

My first educational and research awards were gained at La Trobe University Australia during my undergraduate and honours education. The third year prize was for the highest overall grades obtained by a degree student in the School of Mathematical and Information Sciences (Depts. of Mathematics, Statistics, and Computer Science) in 1986. The following year I won the fourth year prize for the best thesis and overall highest grade in the Honours programme at La Trobe in Computer Science. I was also judged to be the best Honours graduate in the School of Mathematical and Information Science and thus received the D.M. Myers University Medal for 1987.

As a result of my educational merits I received an Australian Government Scholarship and an Industry Sponsorship to pursue postgraduate research. I held these awards for three years.

Subsequently, I have been granted the Mendel Medal for outstanding foreign papers in 1995, was a recipient of Research Fellowships Sponsored by the French Govt. in 1995 and 1998, and have been conferred the Information Technology Programme Teaching Prize at Uppsala University in 2001. In 2008 I was awarded the University Medagogical Prize for the Faculty of Science and Technology.

## Pedagogics

### Position Statement

Teaching, and the pursuit of excellence in teaching is one of my major academic goals. My interest in educational principles and in the development of good teaching practices began when I became a course tutor during my graduate education. Since my employment as a lecturer in the Department of Computer Science and Computer Engineering at La Trobe University in Australia in 1991 I have actively sought to improve my teaching skills, and to impart the knowledge I had gained through my own education, research efforts, and courses in educational practice to others.

My major pedagogic objectives are to,

- promote and develop joy in learning,
- enhance student learning through employing interactive and pro-active teaching methods which actively involve students in the learning process,
- and develop high quality, state of the art, teaching models and methods, and to use these insights to design new courses and investigate alternative teaching methods that maximize student involvement in their own learning. It is my belief that doing this will assist students to maximize their own learning outcomes.

I have been, and continue to work towards these objectives by,

- developing new research methods encouraging high quality studies of educational settings.
- investigating new ways to integrate experiential (problem/experience based) learning into curricula,
- developing high quality online and printed self learning and course support material for students,

- investigating the use of state of the art visual presentation tools, and innovative curriculum design ideas to enhance the courses that I teach and design. My research in this area involves using visualization and IT support facilities to reinforce student learning, and use practical experience to assist in the comprehension of difficult topics.

This summary provides evidence of my focus on these objectives, and supporting evidence for the claim that my contributions to this area of endeavour are significant and of a world class standard. In particular this section summarises my activities in course planning and development over the last twenty years, and indicates the theoretical contributions I have made to Pedagogy in the area of Computer Science through the publication of research on innovative teaching strategies, and the presentation of seminars at Universities in Australia and the abroad.

## Teaching and Lecturing

### Course Development and Presentation

I was actively involved in teaching at La Trobe throughout my employment there. I have a strong interest in teaching and curriculum development and research level contributions in this area appear in papers on curriculum design for parallel computing using simulation[3] and problem based teaching in first year programming courses[15]. The following table provides an overview of my contributions to course design and teaching at La Trobe in the period 1987 to 1999 inclusive.

The job description for the positions to which this application refers nominates the areas of undergraduate large class teaching, graduate supervision and software engineering as among the teaching competencies for a successful candidate. In the light of this I draw the attention of the selection committee to those courses marked with an 'x' in the following table and accompanying text.

	Topic	Level	Lect.(hrs)	Lab.(hrs)	Period
La Trobe University (Australia)					
	Parallel Computers and Networks	3	20	20	1991-1999
	Concurrent Computing	4	20	10	1991-1998
x	Intro. to Programming (Pascal, C++)	1	16	32	1991 - 1994, 1996, 1999
x	Intensive Course in Prog. (Pascal, C, C++)	Grad.	36	72	1991-1998
x	Thesis Supervision	4		60	1991 - 1999
x	Postgraduate Supervision	5 to 9	30/term		1993-1999
Uppsala University (Sweden)					
x	Computer Systems II (ITP), Computer Networking	3	22	-	1999-2001
	Computer Networking (DVP)	3	40	0	1999-2001
x	Computer Systems II (ITP),Dist. and Real-time Sys.	3	36	0	1999-2001

### Details of Pedagogic Achievements

#### Scope of Teaching Efforts

I have taught (on average) three or four courses per year for the last 9 years as can be seen in from the above table. Prior to that my teaching experience was as a tutor and laboratory instructor for courses in Pascal Programming, Lisp and Scheme programming and Parallel Computing at La Trobe University. Most of this experience was gained while I was a doctoral student. Subsequently I was employed at La Trobe as a Lecturer in the Department of Computer Science in 1991, my tenure in this position was confirmed in 1996 and I was promoted to Senior Lecturer in 1998 on the basis of demonstrated excellence in teaching and research. A copy of my application for promotion at La Trobe is included as appendix A for the information of the assessment panel.

#### Level of Teaching Effort

During the last nine years of teaching I have been entirely responsible for all the courses listed in the table. I designed the detailed curricula and assessment criteria for each course based on the standard outlines published in the University Course Handbook. Since the inception of the courses I have also been involved in revising the curricula and in chairing department working

groups to rationalize curricula for the engineering courses in operating systems, computer systems. This activity was part of an overall restructuring of courses to eliminate redundancy and divide course topics appropriately between year levels.

### **International and National Recognition of Teaching Excellence**

Pedagogical Prize of Uppsala University, 2008  
Info. Tech. Program Students Award for Best Teacher, Uppsala, 2001.  
Invited Speaker at Uppsala Learning Laboratory 2000.  
Invited Seminar at Stanford Univ USA, 2000.  
Invited seminar Rochester Institute of Technology 1999.  
Dept. nominee for Faculty Awards for "Teaching Excellence", La Trobe 1999.

### **Detailed Comments on Individual Courses**

#### **Courses Given at La Trobe University (Australia)**

**x CSE1SCPP: (Crash Course in C++ Programming and OO Design)** A first year level intensive programming course designed to provide basic object oriented design, and programming skills to students undertaking a postgraduate diploma in computer science. The course was initially presented using Pascal, revised to use C, and then revised and extended to introduce OO design concepts and teach C++.

**Syllabus:** Data types, control structures, input/output functions, recursion, one-dimensional arrays and strings, multi-dimensional arrays, structures, memory allocation, files, pointers, abstract data types, and sorting and searching applications.

**Format:** Twenty eight (28) three hour sessions, comprising a one hour lecture and a 2 hour laboratory class emphasizing practical experience.

**Contribution:** Developed the course in 1991 and revision of the course in subsequent years to maintain relevance and ensure state of the art presentation of the material. Wrote the lecture series for Pascal, revised and redesigned the course to use C and then completely redesigned and extended the course content to teach an introduction to object oriented programming using C++.

Presented the lectures in this course every year from 1991-1998 inclusive, and was the primary author of a set of laboratory manuals and programming examples totalling some 150 pages of text. Recent editions of the course notes were also developed using Powerpoint Animations to illustrate difficult programming concepts such as recursion, and modification of complex data structures such as trees, lists and queues.

**x CSE10CPP: First year Introduction to Programming with C++** A first year introduction to software design and implementation using C++. OO concepts and an introduction to software engineering principles. The course has an average annual enrollment of approximately 450 students.

**Syllabus:** Definition of a computer, hardware components, bus, memory, cpu. Data forms, analogue, digital, representation of numbers and characters (ASCII), fixed and floating point representation, two's complement arithmetic, assembly language. Techniques for algorithm development and software engineering, refinement, top down design, pseudo-code, reuse.

**Format:** Sixteen one hour lectures with eight two hour laboratories, and approximately eight one hour tutorials.

**Contribution:** Development of a lecture series and presentation of that lecture series in 1992-1994. I was also closely involved in the complete revamp of the course to teach

C++ in 1996. The course was restructured and all the materials were rewritten for interactive presentation using PowerPoint. A significant aspect of this contribution was the development of animations to illustrate code functionality and difficult computer science concepts.

**CSE31PAR: Third year course in parallel programming** The course provides an overview of languages, programming models, tools, techniques, architectures and networks.

**Syllabus:** Basic concepts, speedup, interference, interleaving, non-determinism, starvation, fairness, invoking and controlling parallelism, barriers, semaphores, conditional critical regions, monitors, engineering parallel applications. Tools, petri nets, definition, use, reachability trees, folding, and analysis. Hardware, Flynn taxonomy, network and shared memory machines, network topologies, efficiency measures for high performance networks, and routing. Programming Models and Languages: RPC, message passing, dataflow, SISAL, VAL.

**Format:** Twenty one hour lectures and nine one hour tutorials/practical classes.

**Contribution:** Complete responsibility for the course administration, casual staff appointments and curriculum design. Development of the lecture series and its revision over the last few years to include important new developments in the area. Development of online self learning material includes a complete set of lecture notes and multimedia course presentation using a combination of online demonstrations, PowerPoint, and class exercises. Development of three simulation tools, DiST, OBJECTSIM, and PN\_Sim to provide practical hands on modelling and programming experience for shared memory and message passing programming (DiST) modelling and evaluation of networks (OBJECTSIM) and modelling systems using Transition Timed Petri-Nets (PN\_Sim). This course and the use of the DiST tool to provide practical (cost effective) experience with shared memory and message passing programming environments are the subject of a research paper of Parallel Computing Curriculum Design[3]. The use of OBJECTSIM to model networks and provide practical experience with TTPN modelling was the subject of an invited seminar at Rochester Institute of Technology (RIT) in 1999. The lecture notes for this course are currently being revised and extended into a textbook on practical parallel programming. I have taught the course over the period 1991-present.

**CPPCON: Fourth year course on concurrent computing** The course covers architectures for parallel and distributed systems, algorithms, programming optimization techniques, and programming languages.

**Syllabus:** The course is divided into three sections of lectures containing six hours each.

Section one covers programming models, distributed, single address space, Linda, CSP, SR. Programming techniques, RPC, Rendezvous, Client-Server, processor farms, etc.

Section two examines program validation, program proving via predicate calculus, temporal logic and proof lattices.

Section three examines three case studies in architecture design, DASH, DDM, and Connection Machine.

**Format:** Nine two hour lectures and eight one hour student seminars.

**Contribution:** The course concentrates on developing a practical and theoretical understanding of some of the major areas of parallel software development. To achieve these objectives the course discusses the major distributed and shared memory programming models and attempts to engage students in actively evaluating aspects of these areas. Each student prepares and submits for marking a class paper, and also presents a seminar on the class paper topic. This encourages the students to take an active role in their appreciation of this area of computing. I have designed and implemented the course, and

have been solely responsible for assessment, and all other aspects of the course and its content during the period 1991 to 1999. The course was not given in 1996 and 1999 due to staffing shortages and low student enrollment.

### **Courses Given at the University of Uppsala (Sweden)**

I have been solely responsible for the development and delivery of the following courses under the overall direction of the head of teaching at DoCS University of Uppsala, Mats Daniels. As I arrived at Uppsala to teach at the start of August 1999, my contributions to the subjects taught here has been confined to designing lecture presentations and Web based support material, and delivering the course lectures.

**x Computer Systems II (ITP)** A third year level course comprising Computer Networks, Distributed and Realtime Systems, Runestone Project.

**Syllabus:** Computer networks essentials: OSI and TCP/IP models, transport layer protocols, connections, buffering, congestion and flow management, routing, network structures, bridges, routers gateways, firewalls, data transmission, framing, error correction, and physical methods of data transfer.

Distributed and Real Time: characterization of systems, Flynn taxonomy, programming models for distributed and shared data programming, dataflow, synchronisation, mutual exclusion, deadlock, time management and clock management in distributed systems. Realtime schedules, schedulability analysis, dealing with blocking, priority inversion, and jitter in hard realtime systems.

Runestone Project: A collaborative practical project for teams of six students. Each group is made up of three Swedish and three American students. This project investigates the educational implications of cross-cultural collaboration in education. It also investigates the use of IT tools to facilitate group work for teams in which the members are geographically distributed.

**Format:** 20 sessions of 90 minutes, and two full day laboratories.

**Contribution:** Designed and wrote a lecture series and notes based on the course outline in the University Handbook, presented the lecture series, designed the examination, marked examinations and prepared final grades. I have also been active in the design and evaluation of hardware and software communications environments for the Runestone project. Involvement in Runestone is a natural extension of my own interests in educational research, and I have contributed my experience in practical team work based education, as well as contributing ideas for enhancing the curriculum and assessment to provide high student motivation. Please see the section of Educational Projects for further details.

**Computer Networking (MNP,DVP)** Third year level courses in Computer Networks offered to Computer Science and Mathematics and Natural Science students at Uppsala.

**Syllabus:** Computer networks essentials: OSI and TCP/IP models, transport layer protocols, connections, buffering, congestion and flow management, routing, network topologies, ATM networks, Ipv4 and Ipv6, formal specification and analysis of protocols using petri-nets and finite state machines, bridges, routers gateways, firewalls, data transmission, framing, error correction, and physical methods of data transfer, multiplexing and optical transmission technology.

**Format:** 18 sessions of 90 minutes, and two full day laboratories.

**Contribution:** Adjusted the material presented in Datorsystem II networking subject to make it appropriate to this degree stream, delivered a full series of lectures, designed and marked the required examinations, and prepared final grades.

**Distributed Systems (TFP) 1TT835** A third year level course in Distributed Systems for Technical Physics students.

**Syllabus:** Characterisation of parallel and distributed architectures, Flynn taxonomy of architectures and common extensions to the taxonomy, programming models for distributed and shared data programming, dataflow programming, synchronisation, mutual exclusion, deadlock, time management and clock management in distributed systems. Practical programming using message passing, shared memory and dataflow programming languages such as Modula-P, and Linda.

**Format:** 20 sessions of 90 minutes and two full day laboratories.

**Contribution:** This was taught by me a single time in the spring period of 2000. The lecture series was an extended version of the material presented in the distributed systems section of Computer Systems II. The material developed for that course was supplemented by material taken from courses on parallel and distributed computing at La Trobe. I was responsible for designing the lecture series, setting examinations and preparation of final grades.

**Real-time systems (DVP) 1DT147** A third year level course in Real Time Systems

**Syllabus:** Realtime scheduling techniques, soft vs hard realtime systems, static vs dynamic scheduling, schedulability analysis, dealing with blocking, priority inversion, and jitter in hard realtime systems. Scheduling techniques including static cyclic, rate and deadline monotonic and earliest deadline first.

**Format:** 22 sessions of 90 minutes and 2 full day laboratories

**Contribution:** This course was given once in spring 2000. The lecture series was an expanded version of the real-time systems course material prepared for Computer Systems II. I was responsible for designing the lecture series, setting examinations and preparation of final grades.

## **Pedagogic Training/Education**

In Australia during my work as a lecturer I developed a continuing interest in innovative teaching methods. One aspect of this interest was my involvement in the a range of courses and seminars held under the auspices of the Academic Development Unit at La Trobe. This series of lectures and seminars were presented by members of the University working in innovative teaching, and on research into teaching methodology. During my involvement in the Group I participated in courses on Teaching Large Groups, Effective Public Speaking, Problem Based Teaching, and theories of teaching and learning. This was a part of the ongoing career development for staff at La Trobe.

More recently I have given seminars through this group on the uses of electronic tools to enhance teaching, and worked within the Department of Computer Science and Computer Engineering at La Trobe to organise and implement teaching and pedagogic training courses for Graduate Student staff, and faculty members. The most recent of these courses were arranged prior to the start of the 1997 and 1999 Australian academic years with the objective of providing training to existing staff and graduate students who were joining the teaching staff for the first time. These courses were well attended, and popular with both experienced and beginning teaching staff.

At Uppsala I have been active in Pedagogical development activities and a Director of the CeTUSS National Center for Student Relevant Engineering Education. I have also served as programme coordination for the MSc Programme in Embedded Systems, and the 5-year IT engineering programme.



## Education and Teaching Research

### Development Projects

I have been involved in a number of major courses initiatives that use new approaches to teaching and learning in combination with the use of Information Technology to support and enhance teaching and learning.

**Course Design:** Implementation and Delivery of an intensive 6 week course in programming.

This course was initially conducted as an introductory programming course in Pascal between 1991 and 1994. In 1995 I was responsible for redesigning the course to teach the programming language C. In designing this new course I prepared a wide range of resource materials, including printed notes, PowerPoint animations of difficult concepts, and an extensive set of programming examples from which students could learn implementation concepts. The course materials mentioned here are also listed under the section on production of teaching materials.

**Using simulations to reinforce learning:** An interactive study of problems in programming and modelling for parallel computer architectures and networks. The resulting practical approach to teaching parallel programming, modelling computer networks using Object Oriented Modelling tools, and simulating concurrent systems for analysis using Transition Timed Petri-Nets has been extremely successful, and is very highly regarded by students and academic peers. The learning opportunities provided by using simulation to give practical insights into parallel programming and modelling of parallel systems and networks have also been reported through publication.

**Interactive problem based learning:** Teaching practical programming skills to very large classes is known to be a hard problem. During the first half of 1999 I directed a team which implemented a new integrate approach to teaching programming to large classes. Traditional problem based teaching techniques do not work well in a large class environment, so new techniques using WWW technology and personal feedback on practical work were used to motivate students to understand program development and implementation.

**Distributed project courses:** Developing methods for promoting interactive project development in geographically distributed work teams. This is the Runestone collaborative project between the University of Allandale in Grand Rapids MI, and the University of Uppsala. The project aims to provide experience in team project work using new internet based communication tools. Student groups composed of three students from the USA and three students from Sweden collaborate to solve a practical systems design problem communicating using the Internet. This project gives the students a taste of what it is like to work with fellow students abroad, without travelling on exchange. In addition, it provides very interesting research insights into Internet communication facilities and how they can be used to build up effective work teams that are independent of physical location. The project investigates how the teams develop their working relationships, and evaluate the effectiveness of a range of Internet communication modes in promoting effective global teamwork.

**Impact of technologies on teaching and learning:** Developing studies of the impact of using wireless networks to teach practical courses in computer networking. The study uses interviews and a phenomenological analysis methodology to provide a characterization of the experiences of students when provided with a wireless computing environment.

**Research quality in CS education research:** The proposal and evaluation of educational research in Computer Science (CS) based on formal process models. The intent is define a more academically rigorous approach to CS education research.

Design and use of simulation software for use in teaching and research has been the second aspect of my project activity in both research and education. In the course of my work I have been responsible for developing two research simulation tools, DiST, and OBJECTSIM. In the course of teaching parallel computing courses I also developed a small efficient discrete event simulation for Transition Timed Petri-Nets (TTPN's). This tool has been used to give students practical experience with the process of constructing, implementing, and analysing models of concurrent systems.

## Studies in Teaching and Learning

The implications and learning outcomes of the project described in the previous section on designing a problem based student centered approach to teaching are the subject of a recent research project at La Trobe. The results of the preliminary evaluations of this practical (hands on) approach to teaching a first programming language to a group of 450 students are reported in a paper to be published early in 2000[16]

## Research into Teaching and Training Methods

My research into training and teaching methods which emphasise gaining practical skills is ongoing. I have used a range of simulation tools for teaching. Two of these simulations are products of my research into simulation tools for networks and parallel computer architectures, namely OBJECTSIM and PRISM/DiST. These research simulation tools and PN\_Sim (a custom designed tool for for teaching) are described more fully in the Development Projects section above. A perspective on using simulation tools to provide cost effective hands on experience with parallel programming can be found in [3].

## Production of Teaching Materials

### Books and Compendia of Course Material

This section summarizes the contents, format and number of pages for teaching material I have produced for courses during my academic career. Copies of these materials are available on request, since they were too bulky to attach to this application.

Title	Format	Pages	Year	In Use?
Laboratory Handbook (C++ Proqraming Intensive Course)	Bound Book	approx. 52	1997	1997-1999
Programming Examples Book (C++ Programming Intensive Course)	Bound Book	approx. 57	1997	1997-1999
Lecture Notes Book (C++ Programming Intensive Course)	Printed PowerPoint (2 slides/page)	200	1997	1997-1999
Lecture Notes (Parallel Computing)	Printed PowerPoint (2 slides/page)	120	1995	1995-1999

### Self Study Materials

I have also produced compendia of material produced by students. This has been the case for my fourth year level subject in concurrent systems and programming, where each student produces an extensive report on a topic in the study area, and presents a 45 minute seminar. The topic reports for each year are gathered into a volume of essays on important topics and published at the end of each course.

I have also produced Web pages which provide course information, links to useful material and information on assessment (worked solutions to previous exams for example). Examples of such pages can be viewed on my home web page at La Trobe University, and on the DoCS web site at University of Uppsala (for courses taught at Uppsala).

## Software Tools

Name of Tool	Coding Language	Code Size	Development Period
PRISM/DiST	C, Modula-P	approx. 76.000 lines	1986 - 1998
OBJECTSIM	C++	approx 8.200 lines	1996-1999
PN_Sim	C, C++ version	approx. 2.000 lines	1996

## Contribution to the University

**1997-1999 Student Loans Fund Committee** Served as a member of the University Student Loans application committee, which manages and approves student loans for study related expenses. This involves twelve meetings per year to consider loan applications and prepare policies and strategy papers for submission to the Standing Committee for Student Loans. The committee manages a fund of approximately 1,7 million Australian dollars (approximately 8.5 million SEK), and on average grants and recovers loan funds in the vicinity of A\$ 700.000 (or 3.500.000SEK) annually. I was acting Chair of this committee for a period of 4 months in 1998.

**1997-1999 3rd Year Coordinator** During 1997-1999 I held the position of third year coordinator, with responsibility for the management of all third year subjects in the Computer Science and Computer Engineering Department at La Trobe University. In this capacity I was responsible for allocating and managing quality assurance, setting and administration of teaching schedules, assignment due dates and budget allocation for approximately twenty third year subjects.

This position involved the coordination and direction of approximately fifteen other academic staff, and management of a course budget of approximately \$40000

**1992-1999 Course Adviser/Course Coordinator** In addition to teaching duties I have been a course adviser and course co-ordinator for engineering and computer accounting courses in the Department of Computer Science and Computer Engineering at La Trobe University, Australia during the period (1991–1995).

Duties include,

- Advising students on how to transfer between the degrees offered by the faculty. This often involves advising students who are performing poorly in one degree of their options, and helping them to choose a new course which they might be able to complete successfully.
- Advising students with study problems about their enrollment options. This involves helping students to decide whether to transfer to part time study, and advising them of the consequences of withdrawing from individual subjects in their course.
- Assisting students who have failed some subjects in their course to schedule the remaining subjects they need to complete into as few years as possible, while satisfying prerequisite and timetable restrictions. Validating and checking changes in student subject selections with respect to prerequisite subjects and the requirements to complete a degree in their chosen area.

**1997,1998 Academic Programme Marketing In India** I was delegated by the Dept. of CS and CE at La Trobe to travel as an academic admissions expert on two trips to India organized by the La Trobe University International Programmes Office. The trips were very successful in regards to recruitment of students.

During the trip the desirability of establishing a coursework Masters degree in Information Technology and Business Computing was identified by me. I was subsequently involved in the development of such a programme at La Trobe in conjunction with faculty members from the Graduate School of Business.

## Teaching Performance Evaluation

Staff teaching performance is assessed at the end of every course via a survey which is completed by the students who attended. The feedback from these surveys on my courses has been uniformly good to excellent. An analysis of my teaching performance as measured through student evaluation questionnaires is presented in the attached material as it formed a part of my application for promotion to Senior Lecturer at La Trobe. (See Appendix A). Further information related to evaluations of my teaching performance at Uppsala can also be found there, regrettably much of the analysis is in Swedish.

## Other Information

During 1994 and 1995 I was employed as an educational consultant to provide intensive training courses in C programming to employees of the TabCorp Corporation. TabCorp are the Australian national agency that provide betting systems and manage betting software for all types of racing, including horse and dog races, as well as designing Poker Machines for use in Casino's. I was engaged to provide three 3 day courses over the period at a total cost of approximately A\$7.000 (35,000SEK).

In 1995 the Crash Course in C that I designed for La Trobe University was recommended to students at RMIT University in Melbourne as an appropriate summer subject which could be taken for credit at RMIT University. The student fee income generated through these enrollments was approximately A\$20.000 (100.000SEK).

During 1996 as a part of my activities as Engineering Course Coordinator I negotiated a student scholarship arrangement with a local industry Oakton Computing. The scholarships have an annual value of A\$8.000 (approx. 40.000SEK).

## Research Achievements

### Research Vision

The needs of future computer users cannot be met through the continued development of single processor computers. The development of worldwide communication networks, and the emerging trends in globalization and integration of communication services such as mobile telephone, computer communication, internet, and cable video clearly identify distributed and parallel computing systems, networks, and real-time response as the areas of research priority over the next decade. Clearly a greater understanding of the processes involved in the design and evaluation of computer architectures and networks forms an important part of this effort. Another major focus of research must be the design of appropriate technological support for future computing and communication needs.

My research focuses on three major areas of activity within this framework.

- Simulation of Computer Architectures and Networks.
- Design and evaluation of network architectures, and protocols for the WWW.
- Societal and teaching and learning implications of Internet and mobile computing technologies.

I have more than ten years experience in modeling distributed and parallel computer architectures, computer networks and real-time systems. Activity in the area is supported by a series of world class publications in the areas of memory subsystem design and evaluation for parallel and distributed computers. Simulation methodology, and implementation of state of the art architecture simulation has also been an area of significant contributions. Implementation of two state of the art simulation tools has been conducted under my direction, resulting in

widely distributed publications in the areas of Execution Driven and Object Oriented simulation methods.

Design and evaluation of real-time systems, special purpose parallel and distributed architectures and network designs are issues that will have a significant effect on the development of worldwide computer facilities such as the Internet and WWW. In this context my extensive experience in consistency protocols is applied to the analysis and design of new data consistency protocols for WWW and Peer2Peer applications. Collaborative research with Prof. Pissaloux at the Univ. de Rouen (France) on real-time architectures for image analysis is ongoing.

Another important research area is the use of simulations and advanced teaching methods to improve student learning, and to provide new student experiences. My work in this area over the past 5 years is also particularly relevant to the UpSERG educational research group at Uppsala. Between 1999 and 2001 I have been developing new techniques and educational models for distance interaction, and team work as a part of the research and teaching staff of the Runestone Project. This project provides a focus for my ongoing interest in integrating simulation with teaching in order to provide more diverse "hands on" experience to students.

## Research Experience

I have been an active researcher since the commencement of my PhD candidature in 1987. I have published more than twenty academic papers in internationally refereed conferences and journals since I completed my PhD in 1994. Some other key publications prior to 1994 have been included in the "Full List of Publications" as they refer to important work conducted during my Doctoral candidature.

My research work in the areas of parallel processing and real-time architectures, simulation of computer architectures, and analysis of real-time systems, and networks (12 papers)[2, 1, 8, 9, 14, 13, 18, 11, 12, 19, 4, 20] data visualization[17], genetic algorithms[5], parallel algorithms[10], and education[3, 15, 16, 7, 6] is widely published.

From 1988 to 1992 I worked in the Concurrency Research Group at La Trobe University where I was a doctoral student. During that time I collaborated extensively with the group director Dr. Francis on research related to my doctoral thesis topic. The principal focus of this research was to investigate architecture and operating system innovations that had the potential to improve the performance of Distributed Shared Memory (DSM) multiprocessors. The project centered around developing accurate simulations of DSM multicomputer memory hierarchies and the communication networks over which such hierarchies are distributed. This activity was conducted as a part of a three year research grant from the Australian Research Council (ARC) the major academic funding body to academic research in Australia. See the section on Grants for additional details.

One of the major products of this research was the development of a state of the art execution driven simulation tool capable of simulating large scale DSM multiprocessors. Using this tool to provide performance data estimates I proposed a new DSM architecture design and evaluated a number of design options. The resulting evaluations of network and memory subsystem design alternatives have appeared in a number of international publications.

The DiST simulation method allowed architecture and algorithm simulations to be conducted at varying levels of accuracy. Using an execution driven approach to simulation and taking advantage of the host architecture to effect the outcomes of simulated execution made PRISM/DiST one of the most accurate and efficient simulations of its type. The approach used to achieve automated program annotation, and the resulting ability to build a simple OS for the model architecture, are reported in a paper published in 1991 in the International Journal in Computer Simulation[1].

Throughout the period 1989 to 1993 a number of extensions were made to the PRISM system in order to provide an evaluation platform for the "Odin" DSM architecture. The design and evaluation of "Odin" was the subject of my PhD thesis, and approximately 50since completing

my PhD at the end of 1993. Implementing Odin in PRISM required a new architecture design and the requisite extensions to the kernel, operating system, and runtime libraries. The result of this research was an extended version of the PRISM software, named DiST (Distributed Simulation Testbed). An overview of these extensions, and the experiences gained using DiST to evaluate network and memory subsystem alternatives for DSM can be found in a paper published in the Second International Conference on Computer Simulation[9].

The research on programming models and hardware support for programming on DSM hardware concentrated on three main areas.

- memory consistency and memory subsystem design
- interconnection networks
- programming language support for DSM programming

Work on memory consistency requirements for programming and the design of schedulers and workload allocators for parallel architectures has been reported in the proceedings of the IEEE Symp. on Parallel and Distributed Processing in 1990[?], the proceedings of the 14th and 16th Australian Computer Science Conference in 1991[23], and 1993[18] and in the Proceedings of the Parallel Architectures and Languages Europe (PARLE) Conference in 1993[8]. More recent work that presents a more detailed evaluation of the performance of a proposed "forgetful cache design" can be found in a paper from April 2000 at the Int. Symposium on High Performance Computing[4].

Contributions to network evaluation include the implementation of standard network topologies (mesh, torus, hypercube, cycle/ring) and appropriate deadlock free routing protocols for them. This work is included in the initial implementation of DiST and the performance of DSM on a variety of network topologies and routing strategies has been reported at appropriate international conferences in computer architecture and simulation of computer architectures. Additional work in evaluating more recent network designs that are based on a combination of graph topologies (such as the Cube-Connected Cycles (CCC), Hierarchical Folded Network (HFN) and Hierarchical Cubic Network (HCN) ) have been published more recently[19].

Work on the design and implementation of parallel algorithms for face recognition was conducted in 1997, and the results of this work appeared in the proceedings of the Aerosense 1998 conference in Orlando Florida[10].

From 1994 to 1999 I was director of the Concurrency Research Group at La Trobe, and project leader for the departmental Concurrent Systems Simulation Group. This research programme developed the OBJECTSIM object oriented simulation methodology. The OBJECTSIM environment and methodology have been used at La Trobe University, Uppsala University and the University of Rouen in France for both research and teaching. Ongoing development of OBJECTSIM as a cluster based simulation kernel featuring load migration and dynamic load optimization is ongoing in collaboration with Nicola Thong who is now working at the University of Melbourne.

In addition to the research effort described above collaboration with the University of Rouen, France applies OBJECTSIM to the modelling and evaluation of a parallel realtime object recognition architecture. Joint work on the architecture evaluation between myself, Prof E. Pissaloux (then at Univ de Paris XIII, now at Univ de Rouen) and Dr S. Singh and Prof. T. Dillon (at La Trobe) during 1994, and 1998 generated several related publications[14, 13, 12].

Educational research has focussed on course development the use of research simulation tools to provide practical programming and modeling experience to students. Recent work includes more theoretical studies in teaching and learning which address the learning impacts of access to wireless networking and the use of advanced networks and computer based instruction models to create scalable teaching environments. This work has been funded by the Wallenberg Foundation in Sweden in 2000 and 2001 to a total value of approximately 580K Swedish Crowns (116K AUD). Development and investigation of wireless teaching and learning environments is

the focus of an education renewal project at Uppsala University in 2002 to 2005. Funding for this project is expected to be in the order of 1800K Swedish Crowns, or approximately 360K AUD.

### **Current Research Projects**

- Evaluation and implementation of cache consistency protocols for the WWW and Peer to Peer applications.
- Modeling and performance evaluation of novel network topologies.
- Document replication and management protocols for enterprise wide document repositories.
- Educational methodology and technology in teaching and learning.

Wide scale distributed computing environments, work station clusters, and the World Wide Web (WWW) have significant implications for information management and retrieval. Future research in computer based information management and retrieval needs to address these emerging issues. The aim of our research is to identify and exploit the characteristics of web and peer to peer content to provide reliable up to date copies. In this context we investigate the design of new protocols and the evaluation of these protocols through cluster based simulations.

Educational research involves programmes to develop new and innovative approaches to teaching. This activity has centered on using simulations to provide practical experience to students. Using simulations and modeling software students can obtain much more direct insights in traditionally difficult topics, such as parallel program design and modeling of concurrent systems. Activity in this area has been presented at the International Symposium on Parallel Computing Curricula held at Wellesley College, Boston, USA in 1995.

Research into effective methods for teaching practical programming skills to large courses has also been a focus of research. This effort culminated in the design of a completely new course structure for the C++ Programming course at La Trobe University in Australia. The course design uses problem based learning and Web tools to provide an interactive practical learning environment to a class of approximately 450 students. A paper describing this approach to teaching and presenting some preliminary data on student experiences and learning outcomes has been accepted for publication and will be presented at the International Conference on Simulation and Multimedia in Engineering Education in January 2000.

### **Research Funding History**

With the exception of the first entry, the following table summarizes the funding in grants and income from contracts and sponsorship agreements with industry for which I have been solely and directly responsible over the period 1991 to the present. The first entry relates to a grant under which much of my PhD work was conducted, and which was used to develop the PRISM/DiST simulation suite and perform research in parallel algorithms and computer architectures.

Grant Name	Year	Value A\$ (SEK)
ARC Large Grant	1989-1991	\$120,000.00
Faculty Travel Grant	1991	\$2362 (11.810:-)
Faculty Travel Grant	1992	\$2000 (10.000:-)
Faculty Research Grant (Data visualization)	1993	\$1000 (5.000:-)
Travel Grant Wellesley College, Boston, MA, USA	1995	US\$200 (1.680SEK)
Industry Training Courses (TabCorp)	1995-1996	\$7000 (35.000SEK)
French Govt. Research Fellowship	1995	FF19000 (24.800SEK)
External C Course Teaching	1996	\$20000 (100.000SEK)
French Govt. Research Fellowship	1998	FF20000 (26.100SEK)
Student Scholarships	1996-1999	\$32000 (160.000SEK)
Swedish Learning Lab (Wireless teaching and learning)	2000	580K SEK
Uppsala University (Wireless learning spaces)	2002-2005	1800K SEK

The funding indicated in this table has been employed in research and in sponsorship of students at the Department of Computer Science and Computer Engineering at La Trobe University between 1991 and the present.

## Research Supervision

Details of student supervision at various levels are given below. Unfortunately, due to the employability of Computer Science and Computer Engineering graduates, I have had limited opportunities to attract higher level postgraduate students. Despite this, I have maintained an active research profile, and I am a popular Honours supervisor as demonstrated by the attached project list.

In reading the honours project list it should be noted that the Department of Computer Science and Computer Engineering at La Trobe allocates a maximum of four honours level projects to each staff member for supervision per year. An honours level project is a compulsory section of a fourth year of study comprising 45 points from a year total of 120 points. The project involves compiling a literature review and identifying a research problem in the first six months. The second six months is spent developing this research and gathering experimental results. The resulting thesis report is assessed by two departmental staff. Final marks are in five levels, H1 (exceptional 80-100H3 (Pass 50-59a student's name, their project title, and the final grade.

When considering the final mark for project work it is useful to be aware that students who desire to work with a supervisor apply to that supervisor for a place. The supervisor then selects students to supervise, up to the limit set by the department, from those students who have applied. Consequently popular and respected supervisors tend to attract higher quality students, and have a greater choice of whom they wish to supervise and have a fairly even number of students under supervision in each academic year. Note that the thesis project results for 1999 were not known at the date of this application.

I have examined two masters thesis, and approximately 45 to 50 honours level thesis over the last ten years. I have personally supervised approximately 23 honours level thesis projects. While working in Sweden I have served as advisor and examiner for 3 Honours level equivalent industry thesis projects. Please refer to the following table for full details.



Honours Thesis Supervision or Equivalent			
Year	Student	Thesis Title	Grade
1992	T. Phung	Implementing RPC for Modula-P	Fail
	M. de Rijk	A study of limited directory cache coherence schemes on multicomputers	H1
1993	E. Braddock	A Study of the Cube Connected Cycles	H1
	J. Fulton	An Investigation of Multicomputer Cache Consistency Strategies	H1
	J. Cleeve	Analysis of Chordal Ring Interconnection Networks	H1
1994	N. Wagon,	Parallel Ray Tracing	H1
	K. Shaker,	Visualizing Multicomputer Performance Data	H2A
	D. Grant,	The Impact of Barrier Implementations on DSM Programs	H1
	N. Mai,	Efficient Execution Driven Multicomputer Simulation	H1
1995	P. Perera	Object Oriented Simulation of MIN's	H2B
	D. O'Donnell	Object Oriented Simulation of Multiprocessors	H1
1996	B. Leach	Intranetwork document management with Gossamer	H1
	J. Hansen	Using WWW Document Classes to improve Browser Cache Performance	H1
	A. Keecha,	Evaluating the Hierarchical Cubic Network	H2A
1997	M. Barry,	Intranet document consistency protocols	H1
	M. Ojczyk,	Using OBJECTSIM to model a high speed object recognition architecture	H1
	K. Leins,	Parallel Algorithms for Face Recognition Using IR Images	, H1
1998	N. Thong,	An Empirical Evaluation of the HCN Network	H1
	H. Diab,	Visualization of Multiprocessor Network Performance Data	H1
1999	N. Kurta,	WWW Data consistency	
	J. Elbrish	Evaluating Multicast in Banyan Networks	
	M. Karrar	Using OBJECTSIM to Model the Performance of the GH1	
MSc Supervision			
	D. Hodgson	An OO Parallel Discrete Event Simulation Kernel	completed 1996
	D. Burden	An evaluation of Java as a vehicle for realizing OO designs	completed 2000
	N. Thong	A Cluster Architecture for Parallel Discrete Event Simulation	continuing

## Professional Memberships

- Int. Assoc. for Electrical and Electronics Engineers (IEEE),
- Assoc. for Computing Machinery (ACM),

## Contribution to Academic Culture

UNIX User Group (Victoria) Chapter Committee Member 1996 and 1997

UNIX User Group (Victoria) Conference Chair, and Chair of Organizing Committee 1996 Summer Technical Conference.

Organizing committee member, (SCS) High Performance Computing Symposium 1997-present.  
Programme committee activities,

- Int. Parallel and Distributed Processing Symposium (IPDPS) 2000
- SCS High Perf. Comp. Symp 1997-present
- Mendel Int. Conf. on Genetic Algs. 1995-present
- SCS Int. Conf. on Computer Simulation 1998-present
- SCS Int. Conf. on Systemics, Cybernetics and Informatics 2000.
- Inovative Internet Computing Systems Workshop I2CS 2000-present.

## Professional Referees

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Translations in context of "academic qualifications" in English-Russian from Reverso Context: Table 11 of the Statistical Annex contains information on academic staff by academic qualifications and nationalities. Synonyms Arabic German English Spanish French Hebrew Italian Japanese Dutch Polish Portuguese Romanian Russian Turkish Chinese. Suggestions: academic qualification. These examples may contain rude words based on your search. An academic degree is a qualification awarded to students upon successful completion of a course of study in higher education, usually at a college or university. These institutions commonly offer degrees at various levels, usually including bachelor's, master's and doctorates, often alongside other academic certificates and professional degrees. The most common undergraduate degree is the bachelor's degree, although in some countries there are lower level higher education qualifications that are also Both professional and academic qualifications are important but there are numerous basic differences between these forms of qualification. An academic qualification is degree awarding qualification and entangle in acquiring of knowledge of subjects within academic discipline which is theoretical basis not necessarily the application purpose. While the objective of professional qualification is to equip with knowledge associated with absol. Continue Reading. International Acclaim of Professional & Academic Qualification.