Dr. Farhad Mavaddat [1941-2021]

A Scientist with a Practical Bent, a Good Friend
a Model of Service and Humility, and a Notable Example
of the Consequences of Chasing Brains Away

دکتر فرهاد مودّت (۱۳۲۰ تا ۱۴۰۰)

دانشوری اهل عمل، دوستی خوب، الگویی از خدمت و فروتنی،
و نمادی از نتایج فراری دادن مغزها

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About This Presentation

This slide show was developed for presentation at a December 5, 2021, 12:00 PM EST, Zoom remembrance ceremony for Dr. Farhad Mavaddat.

Edition	Released	Revised	Revised	Revised
First	Dec. 2021			

PowerPoint and PDF slide files:
https://www.ece.ucsb.edu/~parhami/pres_folder/parh21-farhad-mavaddat-remembrance-211205.pptx
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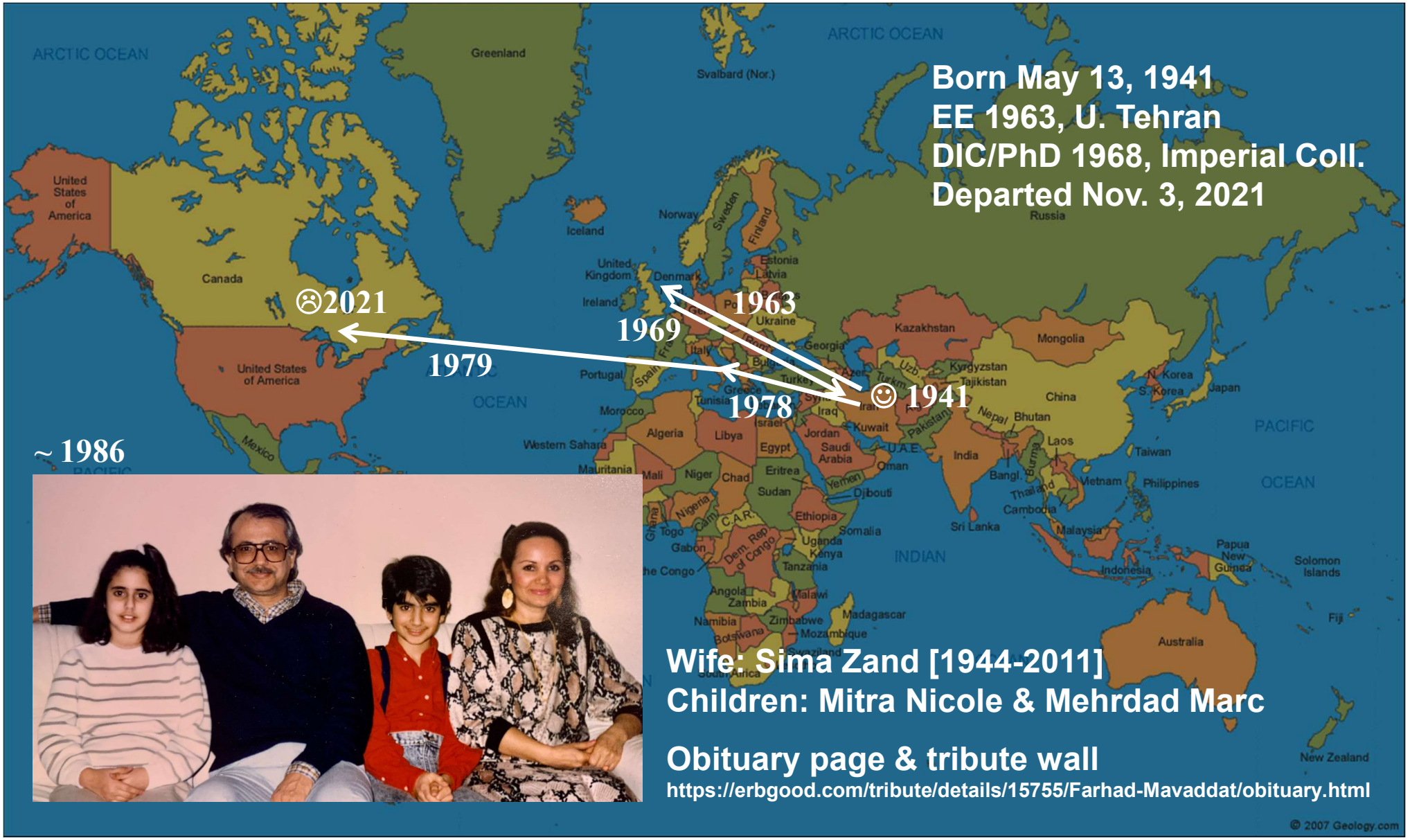
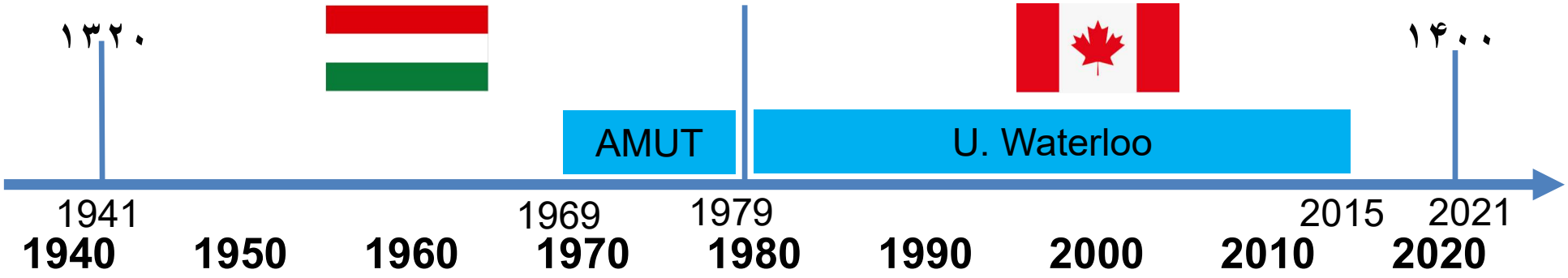
In Remembrance of My Long-Time Friend and Former Colleague, Farhad Mavaddat

به یاد دوست دیرین و همکار فقیدم فرهاد موّدت

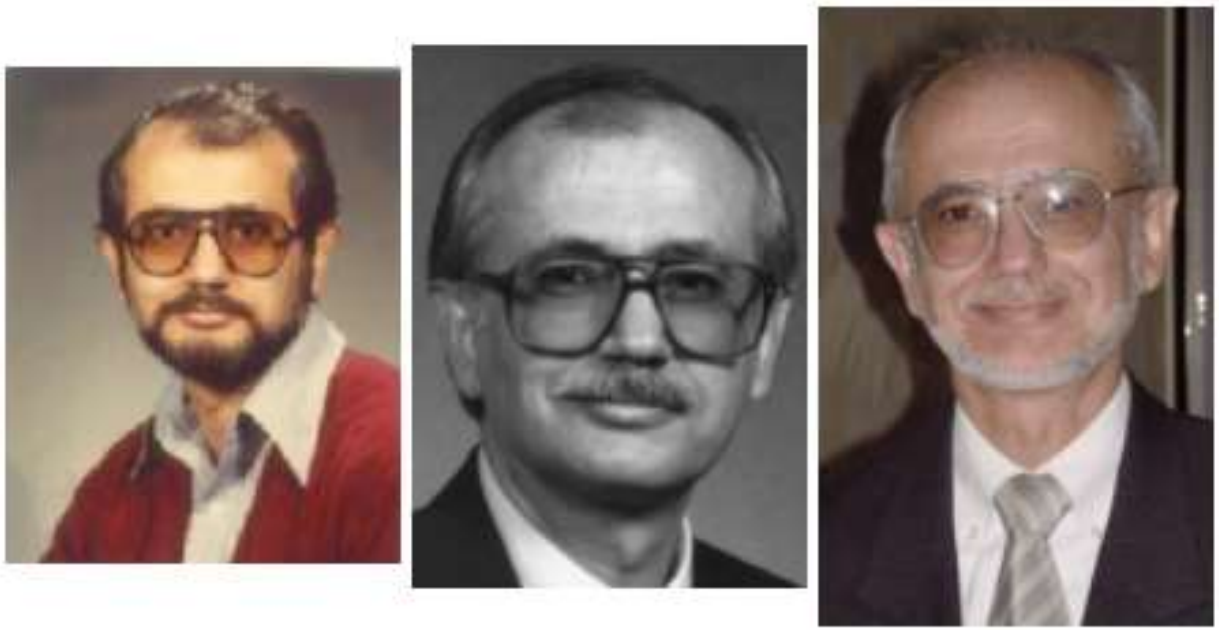
ف	فکر و ذکرت جُمله در اَذهانِ ماست
ر	راه و رَسمت در دل و در جانِ ماست
ه	هستی ات الگوی ِ همّت ، پُشتکار
ا	از وجودت بهره وَر ایران ماست
د	درسِ تو دانش ، کُنش ، آزادگی
م	مکتبت هم بَذر و هم بارانِ ماست

Dr. Farhad Mavaddat's Life Journey





Dr. Farhad Mavaddat … in his own words



Waterloo Years

1980 1990 2000

Home Page of Farhad Mavaddat https://cs.uwaterloo.ca/~fmavadda/

Education, Technology, Industry

EDUCATION

- Ph.D. and D.I.C. (Computing, in Engineering), Imperial College of Science and Technology, London University, 1968.
- Diploma of Graduate Studies (Computer Design), Philips Int. Inst. of Technological Studies, Eindhoven, Netherlands, 1964.
- Engineering Degree (EE), Faculty of Engineering, Tehran University, 1963.

TECHNICAL EXPERIENCE:

My technical experience includes the design and construction of digital computers, multi-CPU computer systems, magnetic tape memories, interface hardware and software, sequential and parallel compilers, communication protocols, processing of speech signals, isolated word-recognition, microprocessor-based systems, analogue and digital simulation models, and commercial packages.

Over the last fifteen years, I have done research and supervised student projects in a wide range of digital design tool areas (specification, synthesis, and verification of layout, logic, register-transfer and behavioural abstractions). As part of these efforts, we have developed computer-aided methods and tools for the design of large-scale digital systems, application specific integrated circuits (ASICs), embedded systems, and the design and introduction of software development processes and tools. Furthermore, I have also used design tools--most notably, the N.2 package and some of the Berkley tools--in logic design and computer architecture courses I have taught. These activities have given me first-hand experience and appreciation of design tools.

I am also familiar with digital signal processing techniques, especially pertaining to processing of speech signals. Furthermore, I am also familiar with the basics of spread-spectrum communication technology.

Industrial Experience

I have over thirty years of work experience at various positions in academia and industry. Although the bulk of this experience is in the academic world, I have maintained a keen interest in industrial and commercial problems and priorities. This is reflected in my research and teaching record.

Moreover, I have spent two sabbatical leaves in the industrial sector. The first sabbatical was taken at IBM Scientific Centre in Italy, where I worked on the initial development of a speech recognition system. The second sabbatical was spent at Ashtech Inc., (Sunnyvale, California) where I helped the company to introduce modern design methods into their design and development process.

More recently (2000), I spent five months with Teledyne Controls (LA, California) helping a Flight Monitoring System development team to comply with Airbus Indstries' ABD100 Development Standards.

Research, Administration, Design

Research Interests of Farhad Mavaddat

Chronologically I have been involved with design and construction of digital computers, have worked on the architecture of multi CPU computer systems, devised algorithms for automatic detection of parallelism in serial programs, have worked on and developed techniques for simulation of discrete and continuous computer models, and designed and implemented systems for recognition of isolated words by computers.

Recently I have been mostly involved with the development of techniques and methods for engineering and codesign of component-based hardware and software systems.

Administrative Experience

I have acted as program coordinator, department chairperson, and laboratory director in academia, and the VP of Engineering at Ashtech, a $35M high-tech company specializing in the design and manufacture of GPS receivers.

As a co-ordinator of the Computer Science program at AMUT, I was responsible for cross-managing the development and delivery of a graduate-level interdisciplinary program involving Mathematics, Electrical Engineering, and Industrial Engineering departments.

As department chairperson at AMUT, I was responsible for the day-to-day operations and the long-range plan of a large academic department comprised of 20 faculty members, 10 staff, and over 200 undergraduate and 50 graduate students during a period of social and political unrest in Iran.

As the Acting VP of Engineering at Ashtech, eight group managers, representing the range of GPS's enabling technologies, reported to me. Furthermore, in this capacity, I co-ordinated the joint development of products between the Sunnyvale and Moscow offices of Ashtech.

Design and Re-engineering of Systems.

On several occasions, I have been the main force behind new developments or changes aimed at improving the quality, efficiency and competitiveness of a business or academic enterprise. These developments or changes can be categorized as:

1. promotion, design, and implementation of software (or embedded system) development methods and processes;
2. design and re-engineering of business processes aimed at increasing their flexibility, and responsiveness to customer needs;
3. design, recruitment, and delivery of new educational programs aimed at making universities more responsive to the needs of students, industry, and society;
4. encouraging a laboratory-based experimental approach to computer science by promoting the idea, seeking the funds, and securing the needed space, machinery, and human resources;
5. improving the content and relevance of computer science programs by introducing hands-on software and hardware courses;
6. introduction of new teaching methods aimed at improving the effectiveness and appeal of existing courses.

Selected Publications (2000-2010)

1. Cristina Ribeiro, Farhad Mavaddat and, Alexander Ferworn, Adaptive Engineering of an Embedded System, Engineered for use by Search and Rescue Canines, selected as the best paper of those presented in the session 'Engineering Concepts, Relations and Methodologies', 2010.

2. Shahram Esmaeilsabzali, Nancy A. Day, and Farhad Mavaddat. C,Interface Automata with Complex Actions: Limiting Interleaving in Interface Automata,C. Fundamenta Informaticae, 82:4, pp. 465-512, IOS Press, 2008

3. Shahram Esmaeilsabzali, Farhad Mavaddat, and Nancy A. Day. C,Interface Automata with Complex Actions,C. In Proceeding of IPM International Workshop on Foundations of Software Engineering (FSEN), (In Cooperation with ACM/SigSoft), pp. 79C197, In ElsevierC-s ENTCS Conference Series, 159, 2006, (The Distinguished Paper Award)

4. Heydarnoori, A., F. Mavaddat, and F. Arbab, "Towards an Automated D eployment Planner for Composition of Web Services as Software Components", Electronic Notes in Theoretical Computer Science, vol. 160, pp. 239C1253, 08/2006.

5. Heydarnoori, A., and F. Mavaddat, "Reliable Deployment of Component-based Applications into Distributed Environments", Proceedings of the 3rd International Conference on Information Technology: New Generations, Washington, DC, USA, IEEE Computer Society, 04/2006.

6. Heydarnoori, A., F. Mavaddat, and F. Arbab, "Deploying Loosely Coupled, Component-based Applications into Distributed Environments", Proceedings of the 13th Annual IEEE International Symposium and Workshop on Engineering of Computer Based Systems, Washington, DC, USA, IEEE Computer Society, 03/2006.

7. Shahram Esmaeilsabzali, Nancy A. Day, and Farhad Mavaddat. C,Interface Automata with Complex Actions - Extended Version,C. Technical Report CS-2005-26, Cheriton School of Computer Science, University of Waterloo, 2005 (Revised May 15, 2006) (29 pages), Technical Report

8. Shahram Esmaeilsabzali, Nancy A. Day, and Farhad Mavaddat. C,Specifying Search Queries for Web Service Discovery,C. In Proceeding of the First International Workshop on Service-Oriented Computing: Consequences for Engineering Requirements (SOCCER), available on Requirements Engineering conference 2005, Website, 2005

9. Seyyed Vahid Hashemian, Farhad Mavaddat, A Logical Reasoning Approach to Automatic Composition of Stateless Components David R. Cheriton School of Computer Science, University of Waterloo, Waterloo, Ontario, Canada. svhashemian@cs.uwaterloo.ca Farhad Mavaddat David R. Cheriton School of Computer Science, University of Waterloo, Waterloo, Ontario, Canada. fmavaddat@cs.uwaterloo.ca

10. F. Mavaddat and A. Arbab. Coordination through Channel Composition. Proceedings of 5th Intern ational Conference, Coordination, 2002.

11. F. Mavaddat, K. Sartipi, and K. Knotogiannis. A Pattern Matching Framework for Software Archi tecture Recovering and Restructuring. Proceedings of the IEEE International Workshop on Program Co mprehension (IWPC), pp. 37-47, 2000.

12. F. Mavaddat, K. Sartipi, and K. Knotogiannis. Architectural Design Recovery using Data Mining Techniques. Proceedings of the IEEE European Conference on Software Maintenance and Reengineering (CSMR), pp. 129-139, 2000.

Selected Publications (1990s)

13. Designing and Modeling VLSI Systems at Register-Transfer Level, *International Journal of Computer Aided VLSI design*, special issue on Modeling, Verification and Synthesis for Zero-Defect VLSI Design, Vol. 2, pp 281-314, 1990.

14. Inductive Assertions on Algorithmic State Machines: A Maple-based Register-Transfer-Level Proof System, *Formal VLSI Correctness Verification, VLSI Design Methods-II*, Editor L.J.M. Claesen, North Holland, 1990, pp 257-266.

15. With Mahmood, M. I. Elmasry, and M. H. M. Cheng, A Formal Language Model of Microcode Synthesis, *Formal VLSI Specification and Synthesis, VLSI Design Methods-I*, Editor L.J.M. Claesen, North Holland, 1990, pp 23-41.

16. With Mahmood, M., and M. I. Elmasry, A Formal Approach to Control Unit Synthesis, Proceedings of IFIP Working Conference on Logic and Architecture Synthesis, Paris, France, May 30-April 1 1990, pp 126-135.

17. With Mahmood, M. and M. I. Elmasry, Experiments with an Efficient Heuristic Algorithm for Local Microcode Generation, Proc. of ICCD '90 International Conference on Computer Design, Cambridge, Massachusetts, September 17-19, 1990, pp-319-323.

18. With Mahmood, M. and M. H. M. Cheng, An Application of L Systems to Local Microcode Synthesis' Proceedings of the 23rd Annual Workshop and Symposium on Microprogramming and Microarchitecture - Micro23, Orlando, Florida, November 1990, pp 166-175, recipient of the best paper award.

19. With J. A. Brzozowski and T. Gahlinger, Consistency and Satisfiability of Waveform Timing Specifications, *Networks*, Vol. 21, pp 91-107, Wiley & Sons, 1991.

20. With Mahmood, M., On Compiling Behaviour to Silicon: A Formal Language Approach, *Integration, the VLSI Journal*, Vol 12, No. 3, North Holland, Amsterdam, The Netherlands, December 1991, pp 239-266.

21. Data-Path Synthesis as Grammar Inference, in *Synthesis for Control Dominated Circuits*, Ed. G. Saucier, North Holland, pp 193-205.

22. The Role of Symbolic Programming in Hardware Verification: The Case of Maple, in *Mathematical Computation with Maple V: Ideas and Applications*, Ed. T. Lee, Birkhauser, Boston, June 1993, pp 176-187.

23. On Transforming Code Generation to a Parsing Problem, in *Code Generation for Embedded Processors*, Eds. Peter Marwedel and Gert Goossens, Kluwer Academic Publishers, 1995, pp 153-170.

24. With Dmitri Galter, Symbolic Verification of Instruction-Set Processors, in *Working Conference on Correct Hardware Design and Verification Methods*, Frankfurt, Germany, October 1995.

24 out of 70 total

Farhad, Before I Met Him

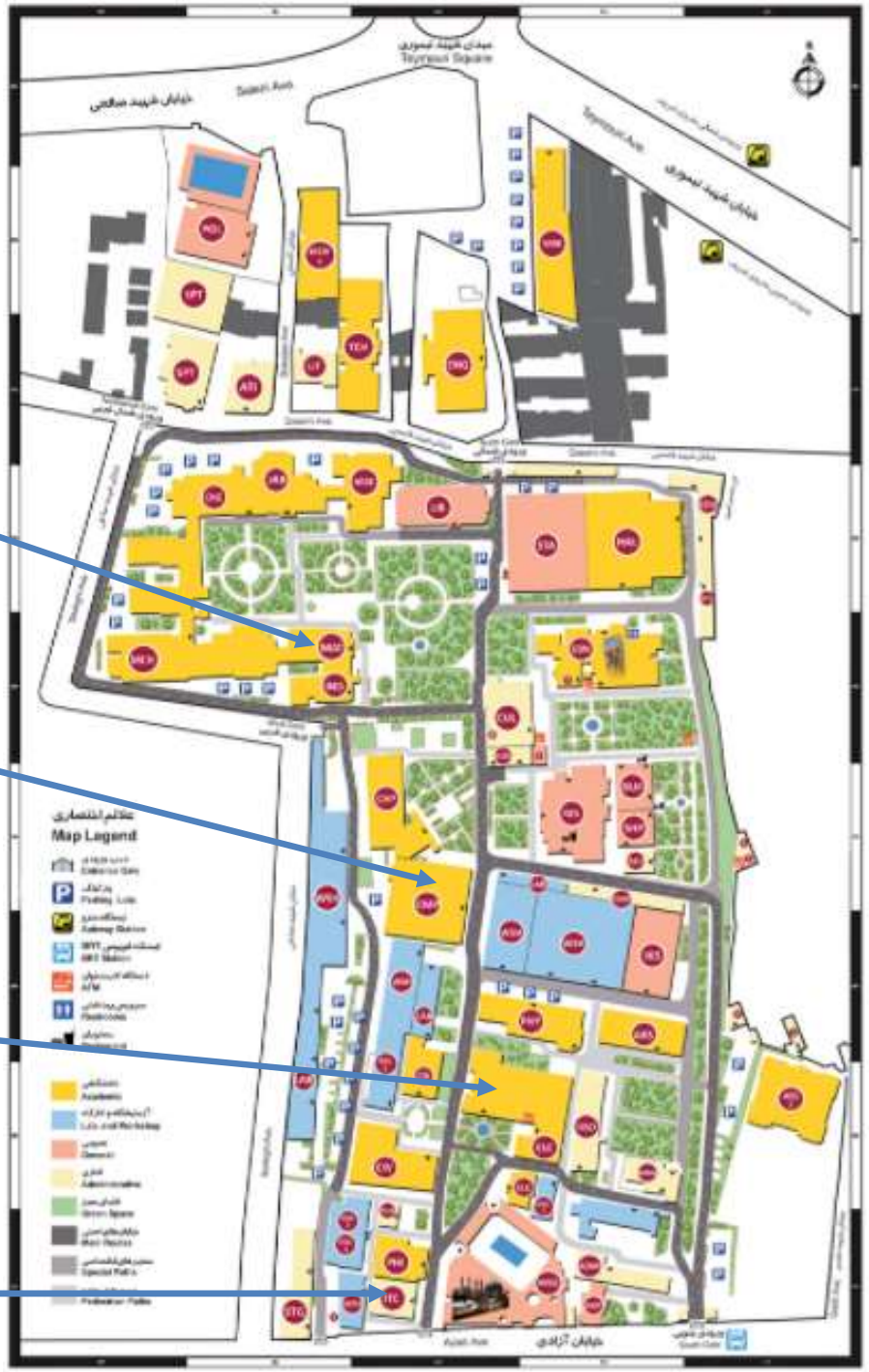
Arya-Mehr/Sharif Univ. of Technology

Math & CS Dept.
(now Math Sciences)

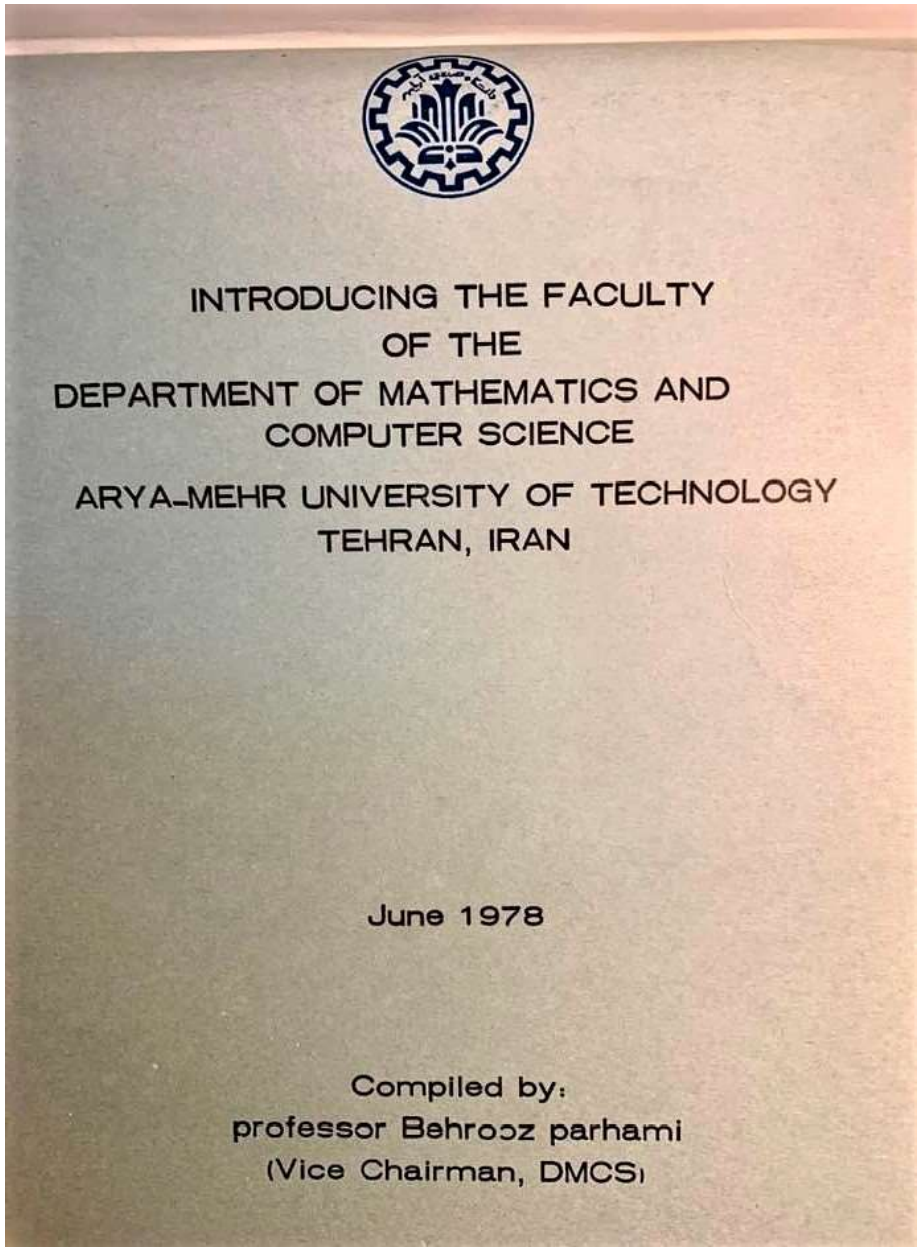
Computer Eng. Dept.
(established 1986)

ECE Dept.

Computer Center



AMUT Dept. Math & Computer Science



INTRODUCING THE FACULTY
OF THE
DEPARTMENT OF MATHEMATICS AND
COMPUTER SCIENCE

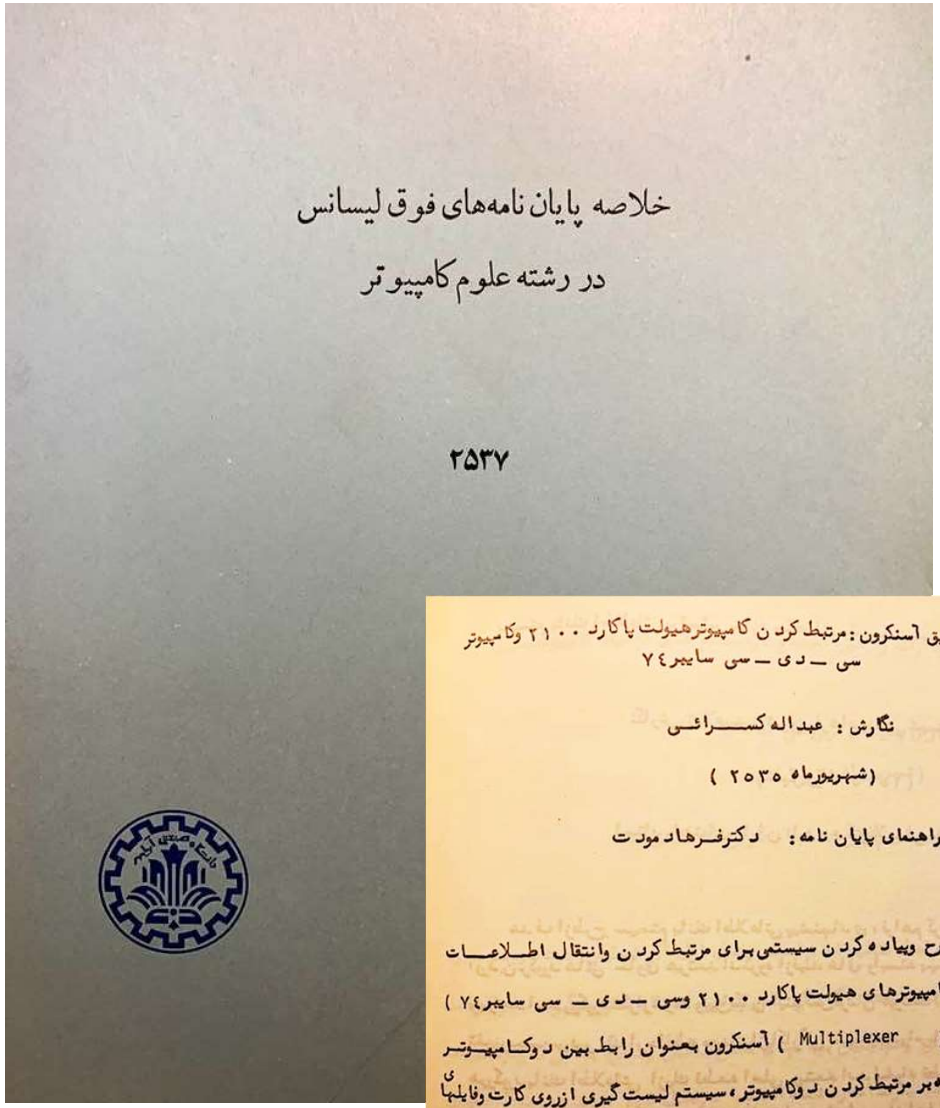
ARYA-MEHR UNIVERSITY OF TECHNOLOGY
TEHRAN, IRAN

June 1978

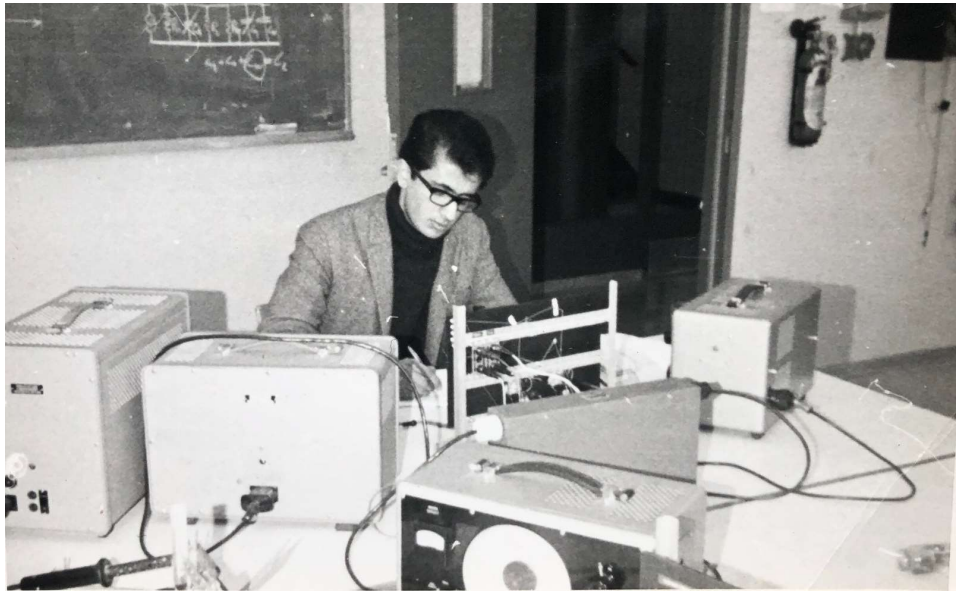
Compiled by:
professor Behrooz parhami
(Vice Chairman, DMCS)

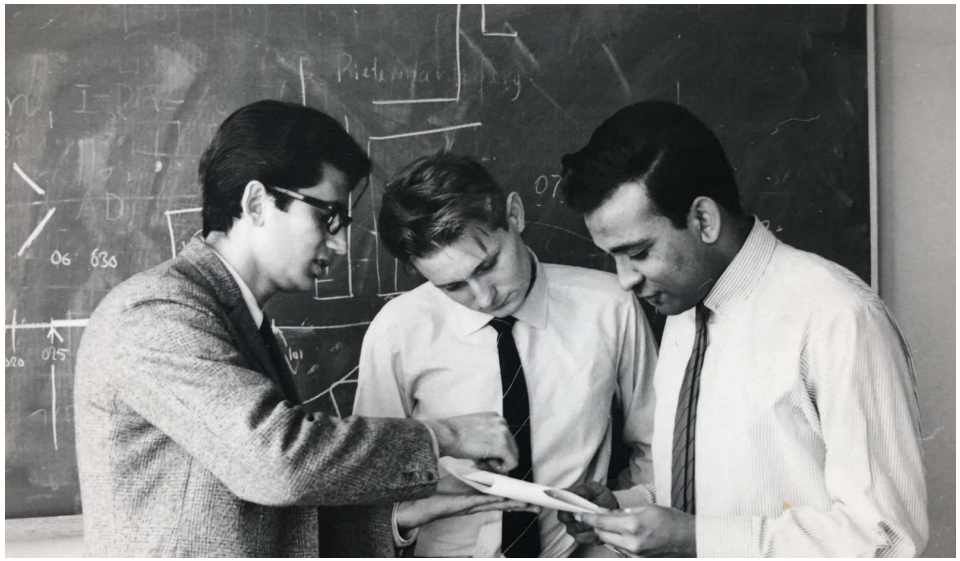
CONTENTS

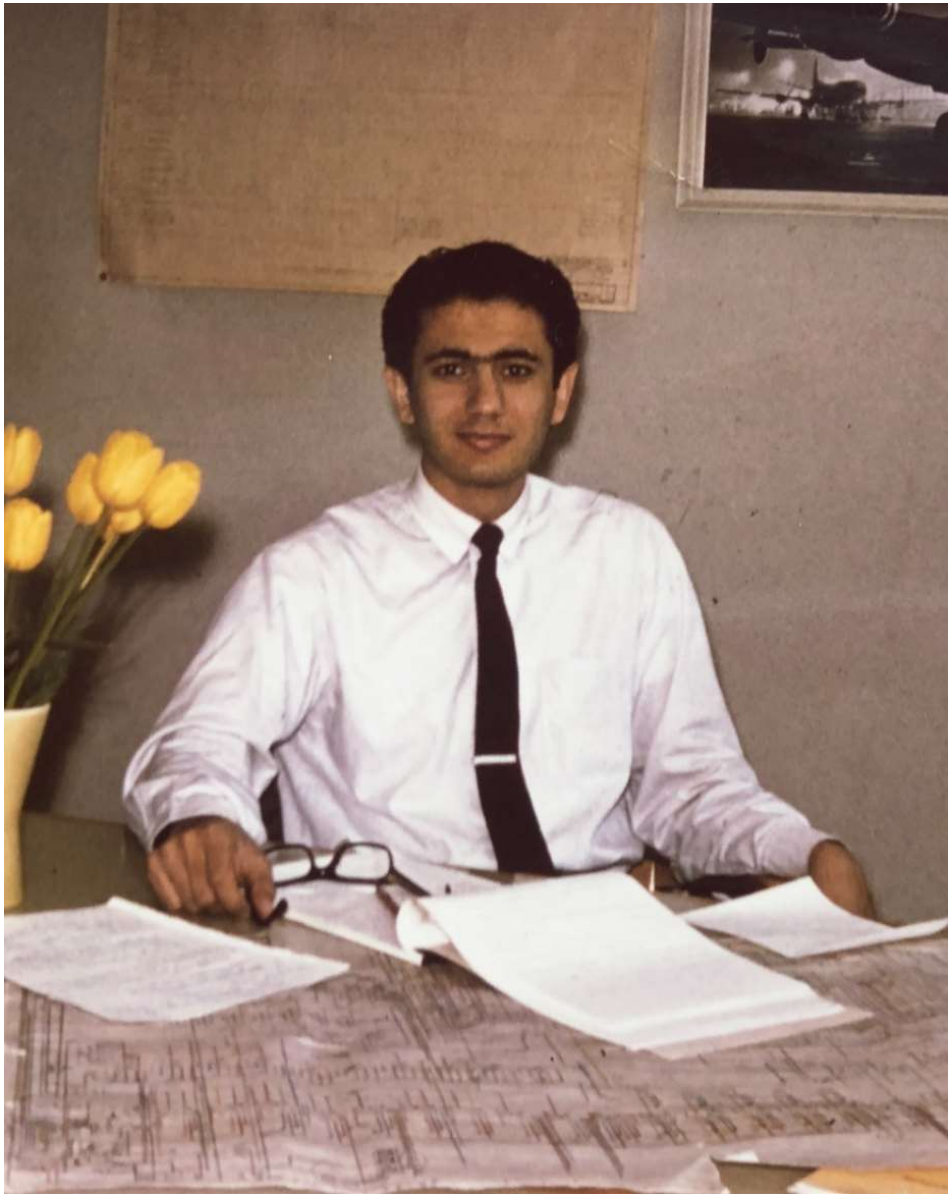
Master's Program in Computer Science



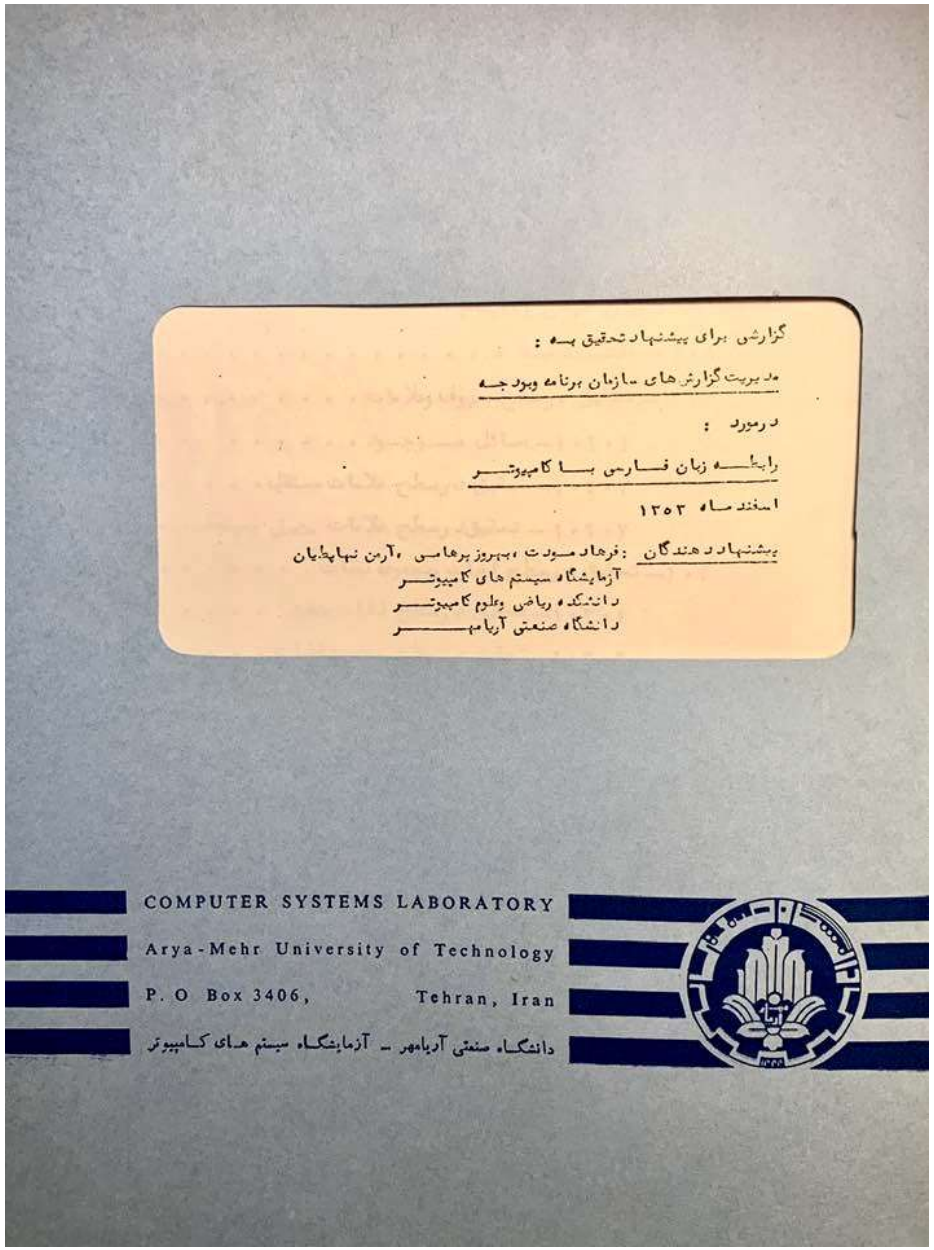
Farhad, the Hands-on Computer Scientist







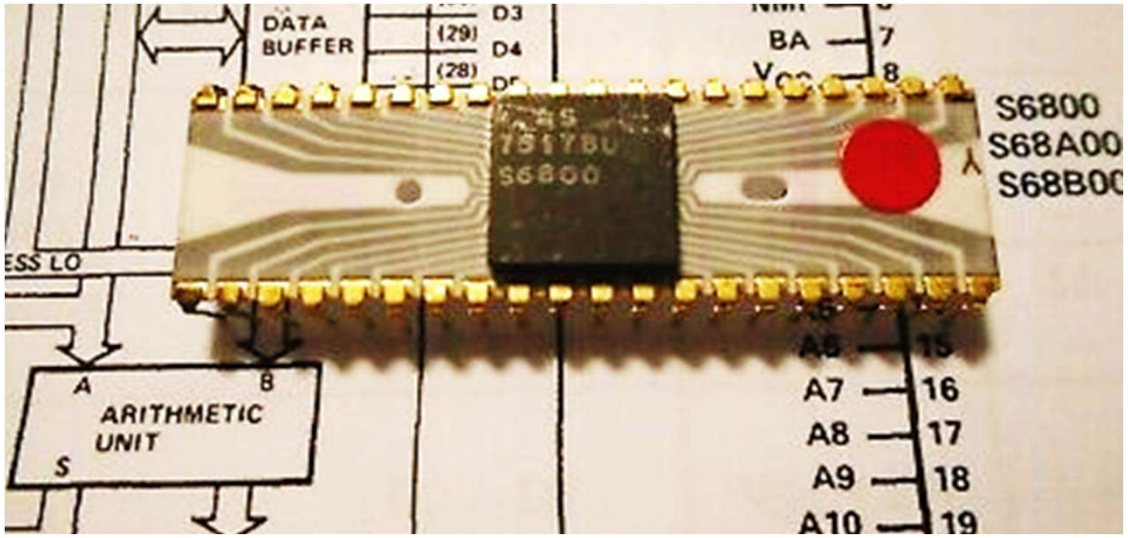
Computer Systems Laboratory



آزمایشگاه سیستم های کامپیوتری

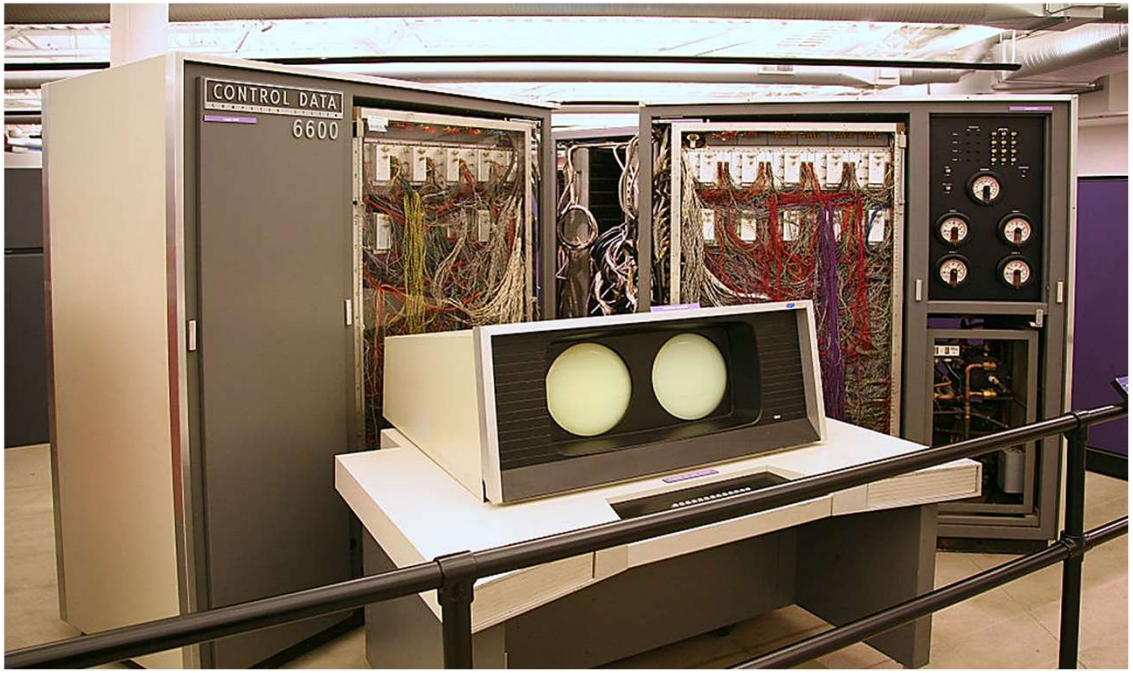
فکرتهیه یك کامپیوترکوچك که بیشتربرای جنبه های آزمایشگاهی ساخته شده باشد ونیزتاسیس یك مرکزپژوهشی علوم کامپیوتر ، که ازاوان تاسیس گروه کامپیوتردردانشگاه وجود داشت ، درسال ۲۵۳۳ بمرحله عمل درآمد ودرقالب آزمایشگاه سیستم های کامپیوتری پیاده شد . منظورازتاسیس این آزمایشگاه دراختیارداشتن یك محیط مناسب وفعال آزمایشگاهی بمنظور ایجاد تجربه ، بالابردن کیفیت آموزش ، آشنائی باطرح وساختمان سیستم های سخت افزار ونرم افزاروبالاخره پژوهش درزمینه های مختلف علوم کامپیوتربود . آزمایشگاه سیستم های کامپیوتری ازابتدابوسیله استادان ودانشجویان علوم کامپیوتراداره شده وکلیه کارهای آن ازقبیل مرتبط ساختن دستگاههای جانبی وطرح سیستم های نرم افزار مخصوص درخود دانشگاه انجام شده است.

Other Labs and Computers



آزمایشگاه سیستم های مایکروپراسسری

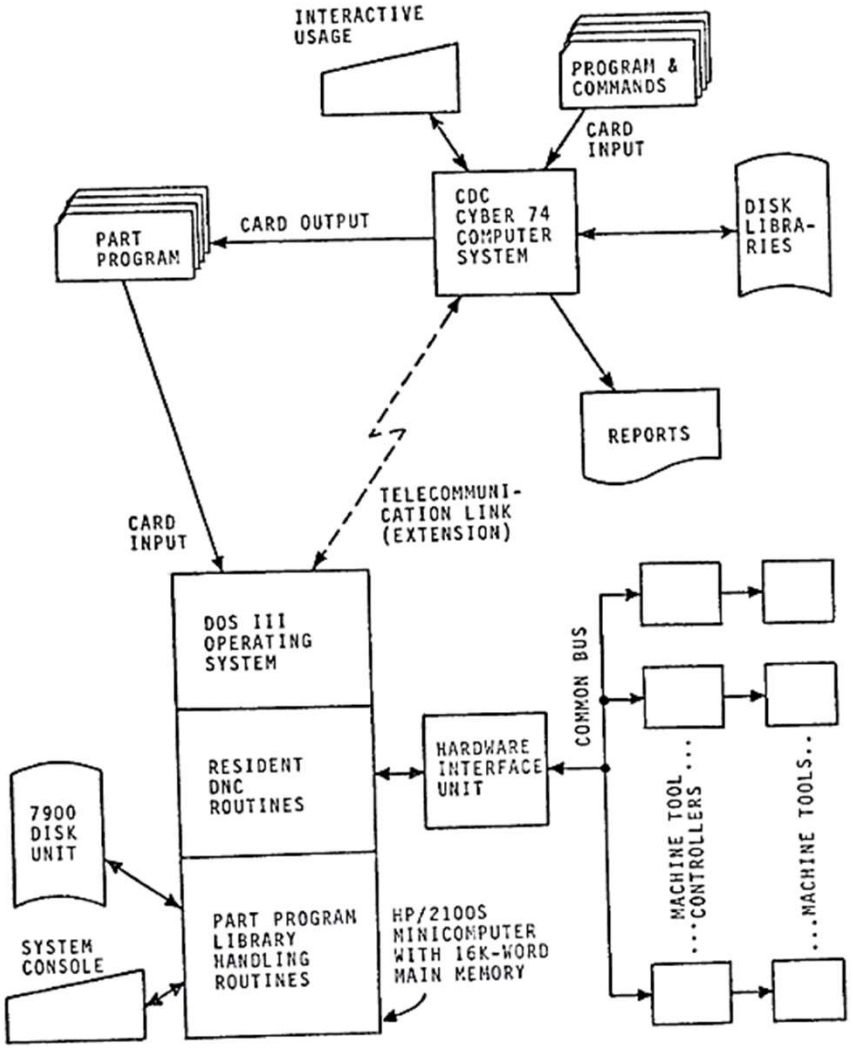
درمیان پیشرفت های اخیرتکنولوژی مربوط به کامپیوتر، پیدایش مایکرو پراسسر (پردازنده مایکرو) مهمترین آنهااست. مایکروکامپیوترهاکه بااستفاده ازمایکروپراسسرهاساخته میشوند نه تنهادربسیاری ازکاربرد های صنعتی وعلمی کم کم جایگزین مینی کامپیوترهامیشوند، بلکه مایکروپراسسرها واحد های ارزانقیمت وقابل اطمینانی هستندکه درطرح انواع سیستم های بزرگترنیزبکارمیروند. همچنین پیش بینی میشود که تاسال ۱۹۸۰، درنود درصد ازتمام وسایل اندازه گیری وکنترل مایکروپراسسربعنوان واحد کنترل بکارخواهد رفت.

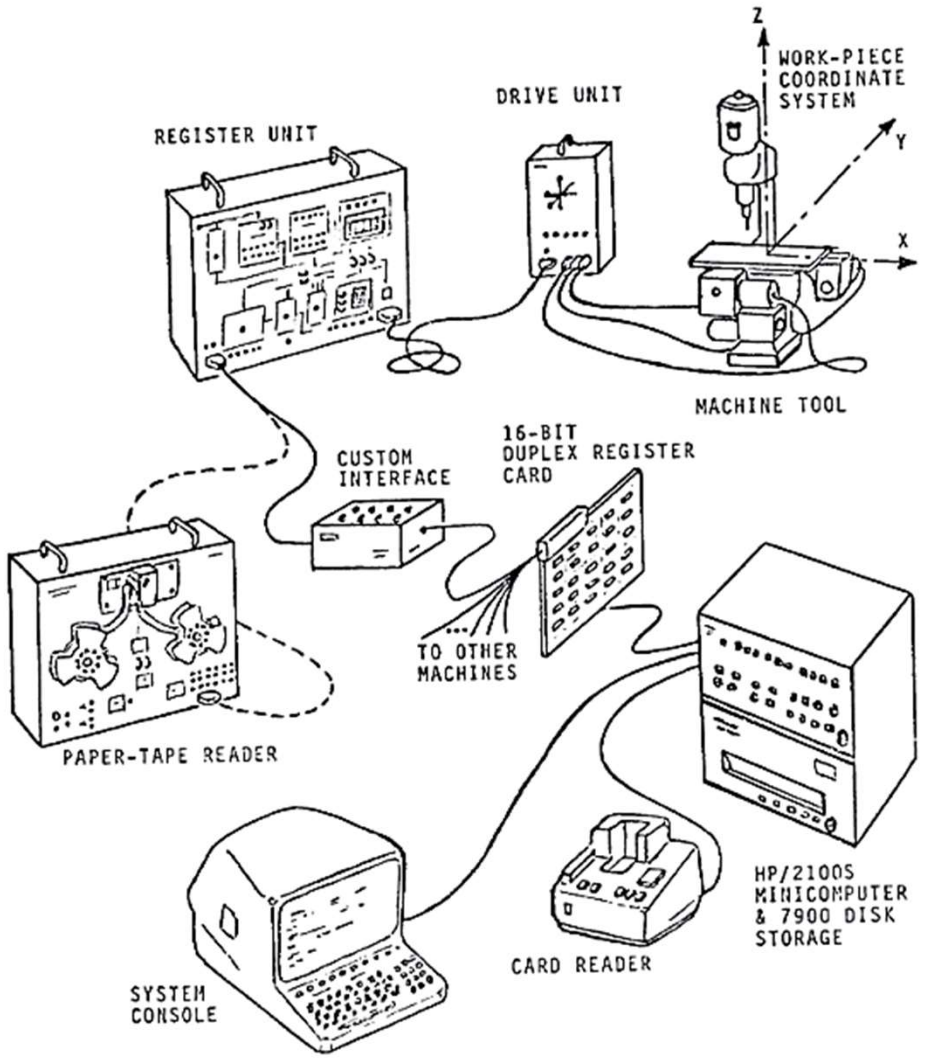


مرکزمحاسبات دانشگاه

مرکزمحاسبات که درجنوب غربی محوطه دانشگاه قراردارد مجهزبه یک کامپیوترازنوع سی ـ دی ـ سی سایبر ۷۴ است که دارای ۱۳۲ هزارکلمه ۶۰بیتی حافظه و ۱۴ پردازنده جنبی (هریک با ۴ هزارکلمه ۱۲بیتی حافظه) است. تجهیزات محیطی این کامپیوترعبارتنداز۸ صفحه مغناطیسی (باضافه یک رزرو) هریک بظرفیت ۳۳ میلیون علامت، ۳ دستگاه نوارمغناطیسی بانوارهائی بظرفیت ۶۰ میلیون علامت ۷ بیتی، یک دستگاه کارت خوان باسرعت ۱۲۰۰ کارت در دقیقه، دو واحد چاپ خطی باسرعت هزارخط در دقیقه وقابلیت چاپ فارسی و لاتین، ۱۳ ترمینال سی ـ دی ـ سی ۷۱۳ که دوتای آنهادارای دستگاه چاپ نیزهستند ویک دستگاه رسّام. نرم افزارموجود برروی سیستم فوق شامل کامپایلرهای زبانهای متداول ازقبیل فرترن، الگال، کوبال و پاسکال است.

Numerically-Controlled Machine Tools

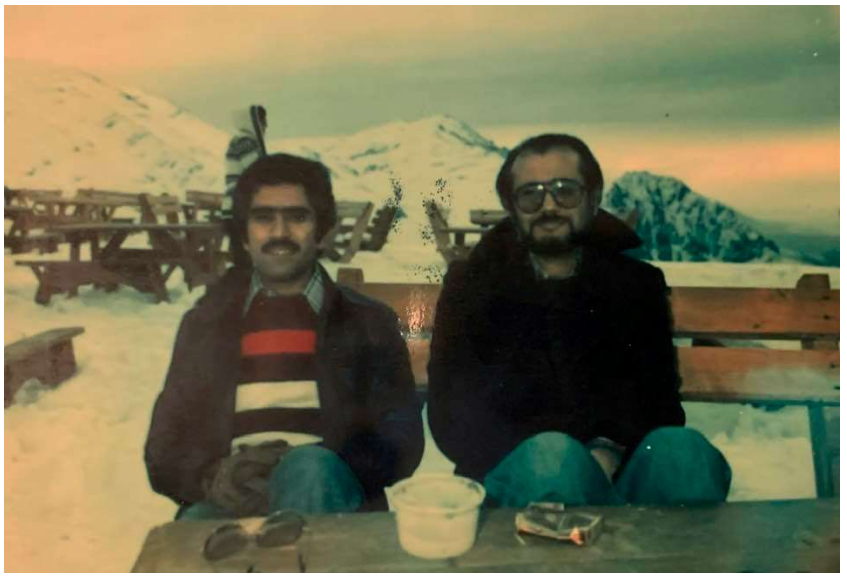




Images from: B. Parhami & K. Alvandi, “Application of a Minicomputer for Direct Numerical Control of Multiple Machine Tools,” 1980

Farhad, at AMUT

On- and Off-Campus with Colleagues



Farhad, with a Few Graduate Students

Farhad Remembered by U. Waterloo

Cheriton School of Computer Science » News » 2021 » November »

In memory of our friend and colleague, Professor Farhad Mavaddat, 1941–2021

MONDAY, NOVEMBER 15, 2021

https://cs.uwaterloo.ca/news/in-memory-of-professor-farhad-mavaddat

We are saddened to announce that our colleague and friend Farhad Mavaddat, retired Professor at the Cheriton School of Computer Science, passed away peacefully on November 3, 2021 at the age of 80.

Professor Mavaddat was born on May 13, 1941 in Tehran. He received a BS in electrical engineering in 1963 from Tehran University, a Diploma of Graduate Studies in 1964 from Philips International Institute of Technological Studies in Eindhoven, Netherlands, and his DIC and PhD degrees in computing in 1968 from the Imperial College of Science and Technology in London.

While at Philips Institute, he was a member of a group of researchers who designed and built a prototype computer using pre-fabricated electronic circuit modules produced by a pre-IC technology developed at Philips.

Farhad's 36 Years at U. Waterloo

Taught courses in computer hardware and architecture

Brought his wisdom to faculty discussions and decisions

Built hardware labs, including a microprocessor lab

Did research on:

- Methodologies for building large-scale systems
- Hardware/software verification and co-design
- Specification, component-based systems, and reuse
- Models of hardware and software composition

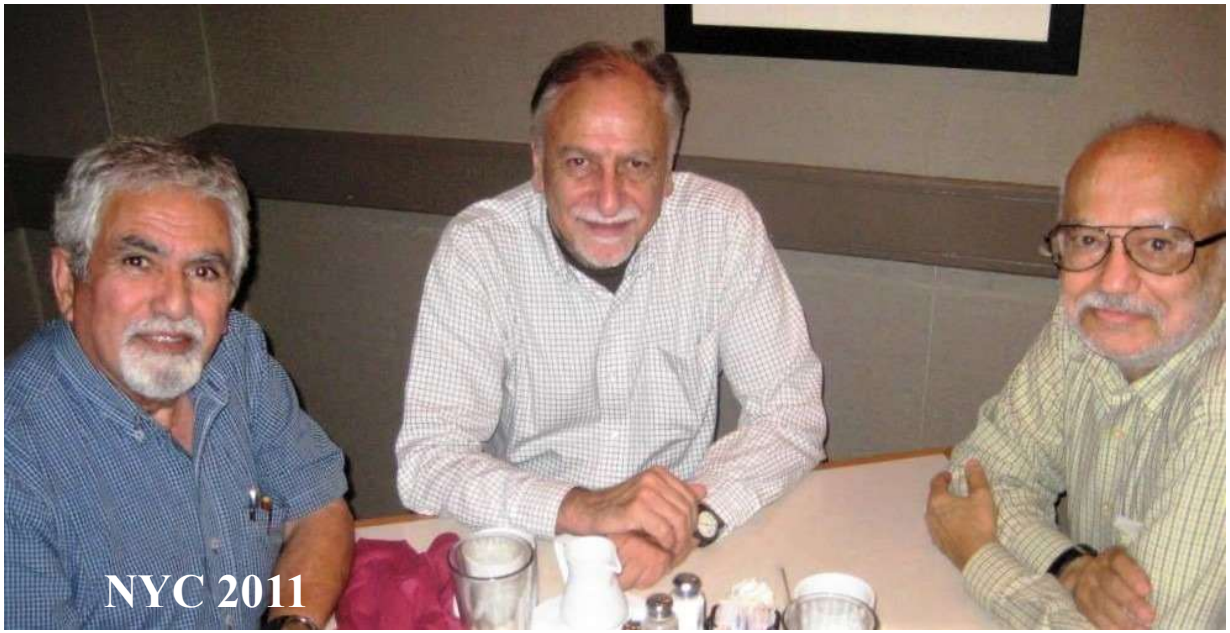
Colleagues remember him as a kind, generous person, with a warm smile; never too busy to chat or help

Our One-Year Reunion in 1986-1987

UNIVERSITY OF WATERLOO

DAVID R. CHERITON SCHOOL OF COMPUTER SCIENCE

Mini-Reunions and Visits Over the Years


NYC 2011

Waterloo 2018


LA 2013

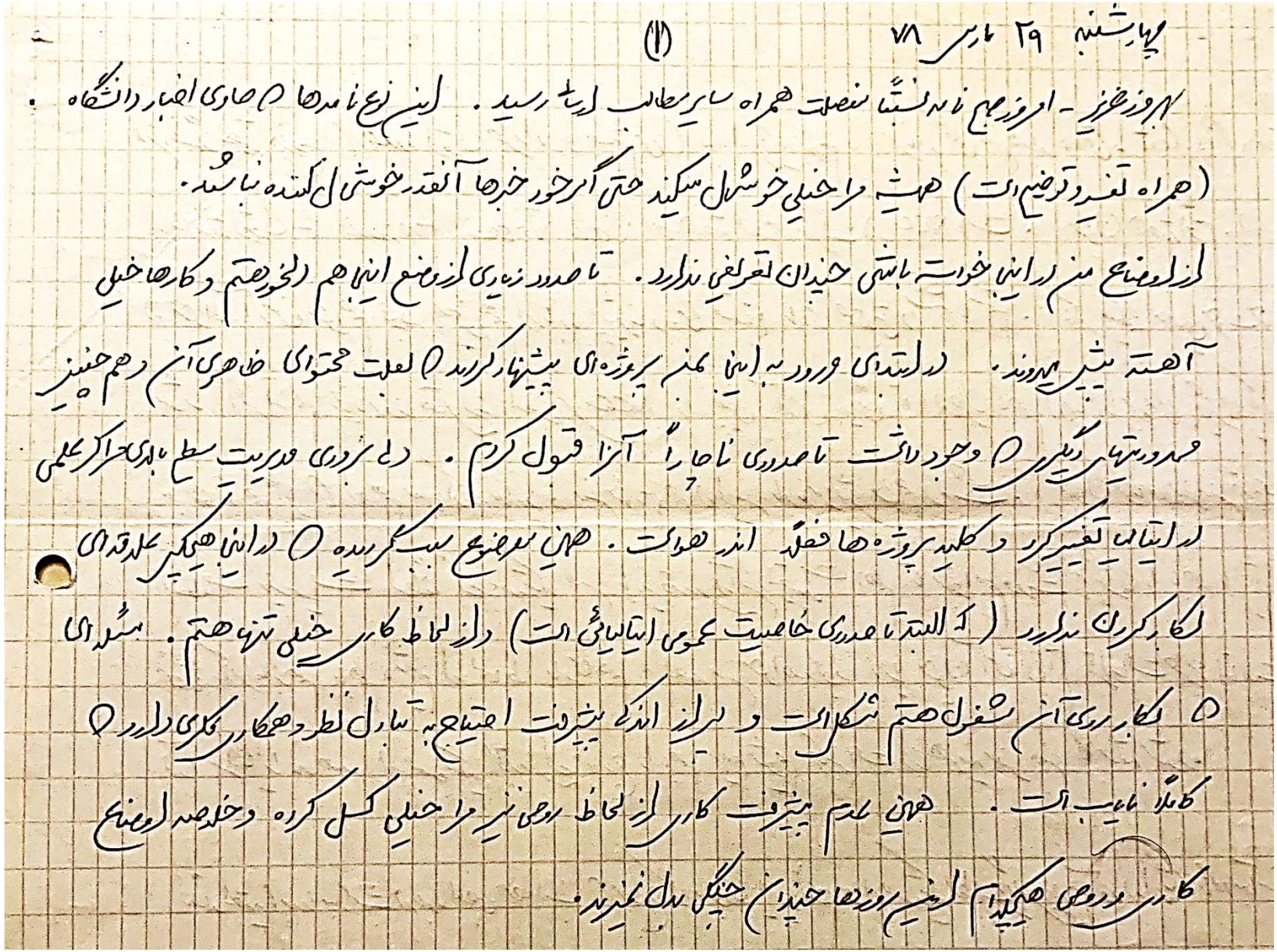

Waterloo 2018

A Memorable Gathering in Berkeley, 2000

Left to right: Armen Nahapetian, Siavash Shahshahani, Behrooz Parhami, Farhad Mavaddat, Morteza Anvari

When We Couldn't Visit, We Wrote Letters

The first half-page of Farhad's letter to me, from his sabbatical leave in Pisa, Italy. He felt somewhat alone and unsupported at IBM Italy



Thank you for your attention!