Dines Bjørner*
Curriculum Vitae & Programme

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Contents

1 Curriculum Vitae

Dines Bjørner's Relations to China:

- Dines Bjørner has traveled in and out of China more than 60 times since 1981.

- Dines Bjørner has had many Chinese scholars as visiting fellows and professors in the 1980s.

- Dines Bjørner has lived in Macau SAR for 5 years as the fist and founding UN Director of the United Nations International Institute for Software Technology, 1981-1997.

- Dines Bjørner has had month-long visiting professorships/lecturer at BeiDa, Beijing, and at Shanghai's JongJi University and East China Normal University.

- Three of Dines Bjørner's books have been translated into Chinese:

- A fourth is currently being translated by Dr. Yang ShaoFa, Institute of Software, Chinese Academy of Science, Beijing – and into Russian by Dr. Mikhail Chupilko et al., Institute of Systems Programming, The Russian Academy of Sciences, Moscow, Russia.

Family:

- Dines Bjørner (Dines Bjørner) was born in Odense, Denmark, 4 October 1937.

- His father had an MSc degree in Mathematics (from Copenhagen University, 1931)

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*for Hong Kong Polytechnic

- and his mother a BA degree in Nordic and Modern English/America Literature (also from Copenhagen University, 1929).

- Since December 11, 1965 Dines Bjørner has been married to Kari Skallerud Bjørner (Oslo, Norway). They have two children,

    - Charlotte with children Camilla and Caroline,
    - and Nikolaj [Partner scientist, Microsoft Research, Seattle, WA, USA] married to Bodil, with children Marianne, Katrine and Jakob.

Educational Background:

- Dines Bjørner graduated, in 1956, with a senior high school degree in Mathematics and Natural Sciences from Århus Cathedral School (founded around 1142).

- Dines Bjørner graduated in January 1962 with an MSc in Electronics Engineering from the Technical University of Denmark (founded by Hans Christian Ørsted in 1828).

- and with a Ph.D. in Computer Science in January 1969 also from the Technical University of Denmark.

IBM Career:

- Dines Bjørner joined IBM in March 1962 at their Nordic Laboratories (founded by Cai Kinberg) in Stockholm, Sweden (where Dines Bjørner also first met Jean Paul Jacob and Gunnar Wedell).

- Dines Bjørner was transferred to the IBM Systems Development Division (IBM SDD) at San Jose, California, USA, in December 1963.

- While doing his Ph.D. (September 1965 – January 1969) Dines Bjørner was a lecturing consultant to IBM's European Systems Research Institute (ESRI) at Geneva, Switzerland (where Dines Bjørner received valuable guidance from Carlo Santacroce and where Dines Bjørner's friendship with Gerald and Dani Weinberg started) (1967–1968).

- In 1969 Dines Bjørner worked at IBM's Advanced Computing Systems (IBM ACS) Laboratory, Menlo Park, California – led by Gene Amdahl, and,

- later that year until early 1973 at IBM Research, San Jose (again Jean Paul Jacob became a colleague).

- Transferred to the IBM Vienna Laboratory (directed then by Heinz Zemanek), Austria, and there working with Peter Lucas, Hans Bekicč and Cliff B. Jones.

- Dines Bjørner resigned from IBM in August 1975 to return to Denmark after basically 13 years abroad.

Career Outside and After IBM:

- During his stay at IBM Research Dines Bjørner was a visiting lecturer, for several quarters, at University of California at Berkeley (1971–1972), instigated by Lotfi Zadeh whom Dines Bjørner considers his main mentor and for whom Dines Bjørner has the fondest regards.

- Dines Bjørner was a visiting guest professor at Copenhagen University in the academic year 1975–1976,

- before taking up his chair in September 1976 at the Technical University of Denmark (DTU).

- During the summer semester of 1980 Dines Bjørner was the Danish Chair Professor at the Christian-Albrechts University of Kiel, Germany — hosted by Prof. Hans Langmaack.

- Together with a colleague, Prof. Christian Gram, Dines Bjørner instigated the Dansk Datamatik Center (DDC) in the summer of 1979 . During the 1980s Dines Bjørner was [the unsalaried] chief scientist of DDC.

- In 1982–1984 Dines Bjørner was chairman of a Danish Government (Ministry of Education) Commission on Informatics.

- Dines Bjørner was the founding and first UN Director of UNU-IIST, the United Nations University's International Institute for Software Technology, located in Macau.

- Dines Bjørner was a visiting professor at NUS: National University of Singapore in the academic year 2004–2005, hosted by Prof. Jin SongDong, and

- at JAIST, Japan Advanced Institute of Science and Technology, near Kanazawa, calendar year 2006, hosted by Prof. Kokichi Futatsugi.

Lectures:

- Dines Bjørner has lectured and regularly lectures on six continents in almost 50 countries and territories and has advised more than 130 MSc's and some two dozen PhDs.

- Dines Bjørner was a visiting professor at Université Henri Poincaré and at INRIA/LORIA, Nancy, France, Oct.–Dec. 2007, hosted by Prof. Dominique Méry.

- During the fall and spring of 2008–2009 Dines Bjørner was lecturing at the Techn. Univ. of Graz, Austria, Oct.–Dec., hosted by Prof. Franz Wotawa, and

- at University of Saarland, Saarbrücken, Germany (March, 1948, hosted by Prof. Wolfgang Paul).

- Dines Bjørner was a distinguished SICSA visitor at the University of Edinburgh (Sept.–Oct. 2009, hosted by Prof. Alan Bundy) and

- a visiting guest professor at Tokyo University, Japan (Nov.–Dec. 2009) hosted by Prof. Tetsuo Tamai.

- Dines Bjørner was a visiting professor at the Technical University of Vienna, Austria (April 2010, hosted by Prof. Jens Knoop) ,

- at Eövös Lorand Univ., Budapest (Oct. 2010, hosted by Prof. Istenes Zoltán),

- at Uppsala Univ., Sweden (Nov. 2010 and May 2016, hosted by Prof. Andreas Hamfeldt) ;

- at Univ. of Bergen, Norway (May 2012, hosted by Prof. Magne Haveraaen), and again (Nov. 2016) .

- In Sept. 2017 Dines Bjørner was a guest researcher at TongJi Univ., Shanghai hosted by Profs. Wu ZhiQiang and Otthein Herzog.

- Oct. 2018 at NUS, Singapore (hosted by Prof. Chin WeiNgan),

- and in Nov. 2018 at ECNU, (East China Normal Univ., hosted by Prof. Zhu HuiBiao) .

Research &c. Work:

- At IBM Dines Bjørner first worked in the hardware (logic and systems) design of such equipment as the IBM 1070 (Sweden), the IBM 1800 and IBM 1130 computers (San Jose), and,

- finally, with Gene Amdahl and Ed Sussenguth, on the IBM ACS/1 supercomputer (Menlo Park).

- At IBM Research Dines Bjørner worked with the late John W. Backus and the late Ted Codd on Functional Languages, resp. Relational Data Base Systems.

- At Vienna, Dines Bjørner, together with such colleagues as the late Peter Lucas, the late Hans Bekič, Kurt Walk, and Cliff B. Jones, worked on a Denotational (–like) Semantics Description of PL/I while, with his colleagues conceiving, researching, developing and using VDM (the Vienna software Development Method).

- At DTU and at DDC, supported by the Commision of the European Community, Dines Bjørner initiated several advanced research & development projects:

  1. **CHILL** (1978–1983):
     (a) Formal Semantics Description of and
     (b) full language Compiler for CHILL (the Intl. Telecommunications Unions Communications [C.C.I.T.T.] High Level Language) — both significantly developed by Peter L. Haff (and the late Søren Prehn);

  2. **Ada** (1980–1984):
     (a) Formal Semantics Description of and
     (b) the first European US DoD officially validated Compiler for the US DoD Ada embedded systems programming language — with significant and indispensable contributions by Dines Bjørner's colleagues Dr. Hans Bruun, Dr. Ole N. Oest and, again, the late Søren Prehn;

  3. **Ada Formal Definition** (1985–1987)
     with primarily a group lead by Prof. Egidio Astesiano, Univ. of Genao, Italy;

  4. **RAISE** (1985–1989)
     (Rigorous Approach to Industrial Software Engineering) headed by the late Søren Prehn and Chris George.

  5. **ProCoS** (1989–1992)
     Provably Correct Systems, with, amongst others, Profs. Sir Tony Hoare (then Oxford, later Microsoft Research, Cambridge, UK), Hans Langmaack (Kiel) and Ernst-Rüdiger Olderog (Oldenburg) and others.

UNU-IIST: At UNU-IIST Dines Bjørner had a rather free hand, and was able, with a small team of excellent colleagues (Prof. Zhou Chaochen (Academician, the Chinese Academy of Science), the late Søren Prehn, Chris W. George, Richard Moore, Tomasz Janowski, Dang Van Hung and Kees Middelburg), to further explore the research issues still occupying Dines Bjørner's interest, and to apply them in a number of joint R&D projects with institutions in developing and newly industrialised countries [including newly independent states] (Argentina, Belarus, Brasil, Cameroun, China, Gabon, India, Indonesia, Mongolia, North Korea, Pakistan, Philippines, Poland, Romania, Russia, South Africa, South Korea, Thailand, Vietnam, Ukraine, Uruguay, etc.).

Societal Work:

- Dines Bjørner was a co-founder of VDM-Europe in 1987 and moved VDM-Europe onto FME: Formal Methods Europe (http://www.fmeurope.org/) in 1991.

- Dines Bjørner co-chaired two of the VDM Symposia (1987, 1990), and the International Conference on Software Engineering (ICSE) in 1989 in Pittsburgh, Pennsylvania, USA.

- Dines Bjørner was overall chairman of the IFIP World Congress in Dublin, Ireland in 1986,

- and was the instigator and General Chairman of the first World Congress on Formal Methods, FM'99, in Toulouse, France, September 20–24, 1999.

- Dines Bjørner was chairman of Academia Europaea's Informatics Section (http://www.ae-info.org/ae/Acad_Main/Sections/Informatics) 2004–2009 (see also Grand Challenges of Informatics (http://www.jaist.ac.jp/ bjorner/ae-is-budapest/)).

- Dines Bjørner has otherwise been involved in about 60 other scientific conferences.

- Dines Bjørner was a member of the parish council of the Virum (Lutheran Protestant Danish Folk) Church for some 5 years.

Awards &c.: Dines Bjørner is

- a Knight of The Danish Flag,

- member of Academia Europaea (MAE),

- member of the Russian Academy of Natural Sciences (MRANS [AB]),

- member of the Danish Academy for Technical Sciences, (ATV),

- member of IFIP Working Group 2.2 (1980-2004, resigned),

- member of IFIP Working Group 2.3 (1980-2008, resigned),

- received the John von Neumann Medal of the JvN Society of Hungary,

- received the Ths. Masaryk Medal from the Masaryk University, Brno, The Czech Republic.

- received the Danish Engineering Society's (IDA) Informatics Division's first BIT prize, March 1999.

- was given the degree of honorary doctor from the Masaryk University, Brno, The Czech Republic, in 2004.

- Dines Bjørner is an ACM Fellow, an IEEE, an IFIP and an FME (Formal Methods Europe) Fellow.

Publications: Dines Bjørner

- has published some 130 papers,

- authored 7 books (3 in both English and Chinese, and 1 in two English editions),

  - 1 monograph,
  - co-authored 2 books
  - and edited & co-edited 11 books.

Research Interests:

- Dines Bjørner's research interests, since his Vienna days, have centered on programming methodology: *methods as sets of principles for selecting and applying mathematics-based analysis and construction techniques and tools in order efficiently to construct efficient artefacts* — notably software.

- Dines Bjørner sees his main contributions to be in the research, development and propagation of formal specification principles and techniques.

- Currently Dines Bjørner focuses on the triptych of

  - domain science & engineering,
  - requirements engineering – emphasising such that relate these in mathematical as well as technical ways:
    * intrinsic, support technology, management & organisation, rules & regulation, and human behaviour facets of domains;
    * projection, instantiation, extension and initialisation of domain requirements, etc.
  - software design methods.

2 Programme: Teaching, Research, Start-ups

- **Assumption:** To make sure that the department

  - besides relevant courses at BSc and MSc levels in current topics of computing[1]
  - teaches, at BSc and first-year MSc level, courses that together covers:
    * "Classical Programming":
      · Programming Languages: logic, functional, imperative and parallel.
      · Data Structures and Algorithms.
      · Program Verification: Proofs, Model-checking & Testing.
    * Classical Computer Science:
      · Discrete Mathematics and Mathematical Logic
      · Basics of Recursive Function Theory, Computability and Lambda Calculus

- **Main Focus of Chair:** To form, within the department, and in close collaboration with its present academic staff a core group of colleagues that cover the following topics:

  - **Course:** Formal Software Engineering: as illustrated by the books [1-9]. This could be accomplished in a three semester course: fall, spring, fall – year 2-3 of a 5 year MSc study.
  - **Course:** Domain & Requirements Engineering: as illustrated by the publications (book) 10-13. This could be accomplished in a one semester, spring course: year 4 of a 5 year MSc study.
  - **Course:** Formal Software Engineering Laboratory: A 4-5 year spring (i.e., 6 month+) course, prior to a MSc. Thesis project.
  - **MSc. Thesis:** Project: Either a theoretical science, or a practical engineering project – along the lines of references [14–16].
  - **Research:** in all of the above – with an emphasis on Domain and Requirements Engineering.

- **Start-ups:** My students have founded several, still existing start-up software houses in connecton with their MSc and PhD work, in Denmark and in the US.[2]

3 Bibliography

1. Dines Bjørner. *Software Engineering, Vol. 1: Abstraction and Modelling.* Texts in Theoretical Computer Science, the EATCS Series. Springer, 2006. See .

2. Dines Bjørner. *Software Engineering, Vol. 2: Specification of Systems and Languages.* Texts in Theoretical Computer Science, the EATCS Series. Springer, 2006. Chapters 12–14 are primarily authored by Christian Krog Madsen. See .

3. Dines Bjørner. *Software Engineering, Vol. 3: Domains, Requirements and Software Design.* Texts in Theoretical Computer Science, the EATCS Series. Springer, 2006. See .

4. Dines Bjørner. **In Chinese**: *Software Engineering, Vol. 1: Abstraction and Modelling.* Qinghua University Press, 2008.

5. Dines Bjørner. **In Chinese**: *Software Engineering, Vol. 2: Specification of Systems and Languages.* Qinghua University Press, 2008.

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[1]– of which it appears to have a fine collection

[2]1. DDCI Intl. (now a US compant); 2. MacVision (now DelTek, a US company); 3, PDC (Prolog Devt. Ctr.); 4. CBrain; ...

6. Dines Bjørner. **In Chinese**: *Software Engineering, Vol. 3: Domains, Requirements and Software Design.* Qinghua University Press, 2008.

7. Dines Bjørner. **In English**: *Software Engineering, Vol. 1: Abstraction and Modelling.* Qinghua University Press, 2008.

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9. Dines Bjørner. **In English**: *Software Engineering, Vol. 3: Domains, Requirements and Software Design.* Qinghua University Press, 2008.

10. Dines Bjørner. Domain Analysis & Description – Principles, Techniques and Modeling Languages. `www.imm.dtu.dk/ dibj/2018/tosem/Bjorner-TOSEM.pdf`. *ACM Trans. on Software Engineering and Methodology*, 28(2):66 pages, March 2019.

11. Dines Bjørner. *Domain Science & Engineering – A Foundation for Software Development.* EATCS Monographs in Theoretical Computer Science. Springer, Heidelberg, Germany, 2021. A revised version of this book is [13].

12. Dines Bjørner. Domain Modelling – A Primer. A short version of [13]. xii+202 pages[3], 2024-2025.

13. Dines Bjørner. Domain Science & Engineering – A Foundation for Software Development. Revised edition of . xii+346 pages[4], January 2025.

14. Dines Bjørner. *Rigorous Domain Descriptions. A compendium of draft domain description sketches carried out over the years 1995–2024. Chapters cover:*

    - *Graphs,*
    - *Rivers,*
    - *Canals,*
    - *Railways,*
    - *Road Transport,*
    - *The "7 Seas",*

    - *The "Blue Skies",*
    - *Credit Cards,*
    - *Weather Information,*
    - *Documents,*
    - *Urban Planning,*
    - *Swarms of Drones,*

    - *Container Terminals,*
    - *A Retailer Market,*
    - *Double-entry Bookkeeping,*
    - *Shipping,*
    - *Stock Exchanges,*
    - *Web Transactions, etc.*

    This document is currently being edited. Own: `www.imm.dtu.dk/ dibj/2021/dd/dd.pdf`, Fredsvej 11, DK-2840 Holte, Denmark, November 15, 2021.

15. Dines Bjørner. Transport – a Domain Description. Technical University of Denmark. DRAFT. 154 pages. `http://www.imm.dtu.dk/ dibj/2025/transport/main.pdf`, May 2025.

16. Dines Bjørner. Banking - a Domain Description. Technical University of Denmark. Incomplete DRAFT. 258 pages. `http://www.imm.dtu.dk/ dibj/2025/banking/main.pdf`, August 2025.

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[3]This book is currently being translated into Chinese by Dr. Yang ShaoFa, IoS/CAS (Institute of Software, Chinese Academy of Sciences), Beijing and into Russian by Dr. Mikhail Chupilko and his colleagues, ISP/RAS (Institute of Systems Programming, Russian Academy of Sciences), Moscow

[4]Due to copyright reasons no URL is given to this document's possible Internet location. A primer version, omitting certain chapters, is