



# Sape Mullender's CV

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## Education

- 1985      Ph.D. in *Wiskunde en Natuurwetenschappen* (Mathematics and Sciences), [Vrije Universiteit](#) in Amsterdam.  
Thesis “Principles of Distributed Operating System Design.”  
Advisor: [Prof. dr. A.S. Tanenbaum](#), Vrije Universiteit in Amsterdam.
- 1978      *Doctoraal Examen* Mathematics (majors in Mathematics and Computer Science, minor in Astronomy), Vrije Universiteit, Amsterdam.

## Employment History

- 2014 – 2022      Chief cook and bottle washer, in the CTO and Chief Architect's office, [Cisco Systems](#), Amsterdam, 40% since 2019
- 1998 – 2019      Extraordinary professor of Computer Science in the Faculty of Electronics, Mathematics and Computer Science of the [University of Twente](#), Netherlands 50% until 2001, 10% thereafter
- 2008 – 2014      Director, Network Systems, [Bell Labs Antwerp](#), Belgium
- 1998 – 2008      Member of Technical Staff, [Lucent Technologies](#), [Bell Labs](#) Innovations, [Computing Sciences Research](#), [Murray Hill](#), [New Jersey](#).
- 1991 – 1998      Full Professor of Systems Research in the [Computer Science Faculty](#) of the [University of Twente](#), Netherlands
- 1996 / 1997      Visiting Scientist, [Inferno Project](#), [Bell Laboratories](#), Lucent Technologies, Murray Hill, NJ (6 months).
- 1992 – 1997      Northernmost Computer Science Professor in the World: Adjunct Professor in the [Dept. of Computer Science](#), [University of Tromsø](#), Norway, *part time*. (My office was at the north end of the computer science building.)

- 1987 / 1988 Visiting Research Fellow, [Cambridge University Computer Laboratory](#), United Kingdom (one year, half time).
- 1986 / 1987 Visiting Scientist, DEC Systems Research Center (SRC), in Palo Alto, Ca (6 months).
- 1986 Interim Head of the Department of Computer Systems & Telematics, [Centre for Mathematics and Computer Science](#) Amsterdam.
- 1984 – 1990 Project Leader of the Distributed Systems Project, [Centre for Mathematics and Computer Science](#) (Centrum voor Wiskunde en Informatica), Amsterdam.
- 1978 – 1983 Faculty Member, [Subfaculty of Mathematics and Computer Science](#), Vrije Universiteit, Amsterdam.

### **Working Groups, Committees, etc.**

- 2022 Member of a [CTI](#) committee for accreditation of the Engineering Sciences at the University of Ghent, the Vrije Universiteit in Brussels and the Katholieke Universiteit Leuven
- 2021 Member of the KPI evaluation committee for TNO ICT
- 2016 Member of a [CTI](#) committee for accreditation of the Engineering Sciences at the Katholieke Universiteit Leuven
- 2013, 2015 Member [NVAO](#) *Visitatiecommissie Opleidingen Informatica cluster 2013* (committee overseeing quality of computer science curricula at Dutch universities)
- 2009 – 2012 Member [EuroSys](#) Steering Committee,
- 2008 – Member Advisory Committee for the [Dept. of Computer Science](#), University of Utrecht
- 2008 – 2014 Member Editorial Board, [Bell Labs Technical Journal](#)
- 2005 – 2007 President, 150<sup>th</sup> Aero Flying Club, New Jersey
- 2005 and 2008 Member of a [Higher Education and Training Awards Council](#) accreditation committee for an Irish University
- 1995/1996 Steering Committee member of the SION Multimedia Research Theme
- 1993 – 1995 Research Dean of the [Computer Science Faculty](#), [University of Twente](#),
- 1995 – Member of the Scientific Council of the University of Twente [Centre for Telematics and Information Technology \(CTIT\)](#)
- 1987 – 1995 Vice Chairman and Conferences Coordinator of the [ACM Special Interest Group on Operating Systems \(SIGOPS\)](#)
- 1994 – 1995 Member of the jury for computer science research proposals (SION) for the [Dutch Foundation for Research \(NWO\)](#)
- 1991 – 1998 Advisor of [CWI](#), the Centre for Mathematics and Computer Science in Amsterdam
- 1991 – 2000 Member of the Executive Board of the [CaberNet](#), European Research Network in Distributed Computing Systems ([Esprit](#))

- October 1991 Consultant for the [Esprit](#) proposals evaluation in Basic Research and Advanced Business and Home Systems
- 1988 – ~ 1990 Member of the Open Software Foundation's Academic Advisory Board (the board dissolved quietly and the foundation became the [Open Group](#))
- 1990 Consultant for the Esprit Call for Proposals in Advanced Business and Home System
- 1989 – 1990 Consultant for the Open Software Foundation's request for technology for a Distributed Computing Environment (DCE)
- 1983 – 1988 Member of the Distributed Systems Management Project of Cost-11, the Mandis project, a project, sponsored by the European Community, in the area of distributed systems for wide-area networks

## **Programme Committee Memberships**

- [SEC'16](#) The First IEEE/ACM Symposium on Edge Computing, October 26-28, 2016, Washington DC
- [ICDCS'12](#) International Conference on Distributed Computing Systems, June 18-21, 2012, Macau, China
- [NOMEN'12](#) First Workshop on Emerging Design Choices in Name-Oriented Networking, March 30, 2012, Orlando, Florida
- [IWP9'11](#) International Workshop on Plan 9, Oct 20-21, Madrid, Spain (chair)
- [BLTC'11](#) First Bell Labs Technical Conference on Cloud Computing, October 18-19, 2011, Antwerp, Belgium (chair)
- IWP9'07 International workshop on Plan 9, December 5-6, Murray Hill, New Jersey (chair)
- IWP9'06 International Workshop on Plan 9, Dec 3-4, Madrid, Spain
- [ICDCS'06](#) International Conference on Distributed Computing Systems, July 3-6, 2006, Lisbon, Portugal
- ICDCS'04 International Conference on Distributed Computing Systems, March 23-26, 2004, Tokyo, Japan
- Ersads'01 European Research Seminar on Advances in Distributed Systems, May 14-18, 2001, Bertinoro, Italy
- [OSDI'99 Third Symposium on Operating Systems Design and Implementation](#), February 22-25, 1999, New Orleans, Louisiana
- OPENARCH'98 First IEEE Conference on Open Architectures and Network Programming, April 3-4, 1998, San Francisco, California
- MMCN'98 Multimedia Computing and Networking, January 26-28, 1998, San Jose, California.
- ICDCS'95 International Conference on Distributed Computer Systems.
- WDAG'94 Workshop on Distributed Algorithms and Graphs, Terschelling, Netherlands, September 1994.
- Seattle'93 Advanced Course on Distributed Systems, Seattle, Washington, June 24 - July 2, 1993 (Programme Chairman).
- 5th European SIGOPS Workshop, Mont Saint Michèl, France, September 1992.
- Lisboa'92 Advanced Course on Distributed Systems, Estoril, Portugal, June 29 - July 8, 1992 (Programme Chairman).

3rd International IFIP WG6.1/6.4 Workshop on Protocols for High-Speed Networks, Stockholm, Sweden, May 13 - 15, 1992.

13th ACM Symposium on Operating Systems Principles, Asilomar, Pacific Grove, Ca., December, 1991.

EIT Workshop on Parallel and Distributed Workstation Systems, Florence, Italy, September 26 - 27, 1991.

Workshop on Operating Systems for the Nineties, Dagstuhl castle, Wadern, Germany, July 8 - 12, 1991.

Karuizawa'91 Advanced Course on Distributed Systems, Karuizawa, Japan, June 9 - 15, 1991 (Programme Chairman).

Bologna'90 Advanced Course on Distributed Systems, Bologna, Italy, July/August 1990 (Programme Chairman).

12th ACM Symposium on Operating Systems Principles, The Wigwam, Litchfield Park, Arizona, December 3 - 6, 1989.

2nd Workshop on Workstation Operating Systems, Asilomar, Pacific Grove, Ca., September 27 - 29, 1989.

Fingerlakes'89 Advanced Course on Distributed Systems, Cornell University, Ithaca NY, July 10 - 20, 1989 (Programme Chairman).

Third European SIGOPS Workshop "Autonomy or Interdependence in Distributed Systems," September 19 - 21, 1988, Cambridge, United Kingdom.

Arctic'88 Advanced Course on Distributed Systems, Tromsø, Norway, July 5 - 14, 1988 (Programme Chairman).

Second IEEE Conference on Computer Workstations, March 7 - 10, 1988, Santa Clara, Ca.

Sixth Symposium on Reliability in Distributed Software and Database Systems, March 17 - 19, 1987, Williamsburg, Va.

Second European SIGOPS Workshop "Making Distributed Systems Work," September 8 - 10, 1986, CWI, Amsterdam (Chairman and Organizing Chairman).

## **Teaching Activities**

University of Twente Computer Science Course number 213011 "Distributed Systems", annually, 1991 - 2018

University of Twente Computer Science Course number 211081 "Secure-Systems Engineering", 1999 - 2001

"Distributed Programming with Plan 9", at Ersads'01 European Research Seminar on Advances in Distributed Systems, May 14-18, 2001, Bertinoro, Italy

"Concurrent Programming", advanced short course given at the University of Tromsø with Rob Pike, Feb 2-5, 2000

University of Twente Computer Science Course number 211080 "System Implementation Techniques", with K. Delcour, 1991 -- 1996

Post-Academic (PAO) Course "Multimedia Databases", with H.M. Blanken and M.A.W. Houtsma, May 1994 and May 1995, University of Twente.

Seattle'93 Advanced Course on Distributed Systems, with Ö. Babaoğlu, H. Kopetz, B.W. Lampson, R.M. Needham, M. Satyanarayanan, F.B. Schneider, M.D. Schroeder, S. Toueg, and W.E. Weihl, Seattle,

Washington, June 24 - July 2, 1993 (Lecturer).

Lisboa'92 Advanced Course on Distributed Systems, with Ö. Babaoğlu, H. Kopetz, B.W. Lampson, R.M. Needham, M. Satyanarayanan, F.B. Schneider, M.D. Schroeder, S. Toueg, P. Verissimo, and W.E. Weihl, Estoril, Portugal, June 29 - July 8, 1992 (Lecturer).

CERN School of Computing, Rome, Italy, August 1992 (Lecturer on Distributed Systems).

Karuizawa'91 Advanced Course on Distributed Systems, with Ö. Babaoğlu, B.W. Lampson, R.M. Needham, M. Satyanarayanan, F.B. Schneider, M.D. Schroeder, M. Tokoro, S. Toueg, and W.E. Weihl, Mampei Hotel, Karuizawa, Japan, June 9 - 15, 1991 (Lecturer).

Bologna'90 Advanced Course on Distributed Systems, with Ö. Babaoğlu, A.J. Herbert, B.W. Lampson, R.M. Needham, M. Satyanarayanan, F.B. Schneider, M.D. Schroeder, S. Toueg, and W.E. Weihl, University of Bologna, Italy, July/August 1990 (Lecturer).

Fingerlakes'89 Advanced Course on Distributed Systems, with K.P. Birman, S.B. Davidson, A.J. Herbert, K. Marzullo, R.M. Needham, M. Satyanarayanan, F.B. Schneider, M.D. Schroeder, S. Toueg, and W.E. Weihl, Cornell University, Ithaca NY, July 10 - 20, 1989 (Lecturer).

Arctic'88 Advanced Course on Distributed Systems, with K.P. Birman, A.J. Herbert, R.M. Needham, M. Satyanarayanan, M.D. Schroeder, A.Z. Spector, and W.E. Weihl, Tromsø, Norway, July 5 - 14, 1988 (Programme Chairman and Lecturer).

PAO Course "Computer Networks", CWI, Amsterdam, June 1986, June 1987, November/December 1988, and June 1989.

Tutorial Distributed Systems (with Roger Needham en Dag Belsnes), Tromsø, Norway, June 1986.

Computer Networks Course, CERN, Geneva, April 1985.

## PhDs Supervised

Dr. Tom L.P. Wood, *The Lightweight Flow Engine, a Model for Rapid Development and Emulation of Telecommunication Services*, University of Twente, September 13, 2013

Dr. [Özlem Durmaz İncel](#), *Multi-Channel Wireless Sensor Networks: Protocols, Design and Evaluation*, University of Twente, March 20, 2009

Dr. [Maria Lijding](#), *Real Time Scheduling in Tertiary Storage*, University of Twente, May 1, 2003

Dr. [Tage Stabell-Kulø](#), *Private Computing*, University of Twente, June 28, 2002

Dr. [Paul J.M. Havinga](#), *Mobile Multimedia Systems*, University of Twente, February 11, 2000

Dr. [Peter Bosch](#), *Mixed-Media File Systems*, University of Twente, June 25th, 1999

Dr. Johannes E.A. van Hintum, *Quality Constraints and Constrained Quality*, Eindhoven University of Technology, November 3rd, 1997 (as 2nd promotor; 1st promotor: Prof.dr Dieter K. Hammer)

Dr. [Arne Helme](#), *A System for User-Controlled Electronic Transactions*, University of Twente, August 21st, 1997

Prof. dr. Roger M. Needham, FRS, [Doctor Honoris Causa](#), University of Twente, November 29th, 1996

Dr. ir. Jan M. Nauta, *Vehicle Trajectory Planning with Interval Arithmetic*, University of Twente, June 6th, 1996

Dr. ir. [Gerard J. M. Smit](#), *The Design of Central Switch Communication Systems for Multimedia Applications*, University of Twente, February 17th, 1994

## Patents

1. 1035707-US.01, Detecting Broken Object Level And Function Level Authorization Issues With API Services, Peter Bosch, Alessandro Duminuco, Sape Mullender, Julien Barbot, Ariel Shuper, 18 Jan 2022
2. 1033481-US.02, Assessing Security Vulnerabilities in Cloud-Native Applications, Peter Bosch, Randy Birdsall, Alessandro Duminuco, Zohar Kaufman, Sape Mullender, 30 Jun 2021
3. 1032318-US.02, Penetration Testing for API Service Security, Peter Bosch, Alessandro Duminuco, Sape Mullender, 30 Jun 2021
4. 1031773-US.01, Vulnerability Analysis Using Continuous Application Attestation, Peter Bosch, Alessandro Duminuco, Sape Mullender, 14 Jun 2021
5. 1031074-US.01, Automatic assessment of API service security standing with API reputation scoring, Peter Bosch, Alessandro Duminuco, Sape Mullender, Jeff Alaoui, 09 Apr 2021
6. 1029225-US.01, Selective Policy-Driven Interception Of Encrypted Network Traffic Utilizing A Domain Name Service And A Single-Sign On Service, Alessandro Duminuco, Peter Bosch, Jeff Napper, Vinny Parla, Julien Barbot, Sape Mullender, 03 Feb 2021
7. 1028474-US.01, Nonce-Based Enterprise Security Policy Enforcement, Peter Bosch, Jeff Napper, Alessandro Duminuco, Sape Mullender, Julien Barbot, Vinny Parla, 05 Feb 2021
8. 1028015-US.01, Per-Device Single Sign-On Across Applications, Ahmed Ahmed, Sape Mullender, Peter Bosch, Alessandro Duminuco, Jeff Napper, 04 Jan 2021
9. 027881-US.01, Steering Traffic On A Flow-By-Flow Basis By A Single Sign-On Service, Peter Bosch, Alessandro Duminuco, Julien Barbot, Jeff Napper, Sape Mullender, 13 Oct 2020
10. 1027446-US.01, Dynamic User Authorization With A Service Provider, Sape Mullender, Peter Bosch, Alessandro Duminuco, Ahmed Ahmed, Aaron Woland, 10 Aug
11. 202011026541-US.01, Streamlined Authentication And Authorization For Virtual Private Network Tunnel Establishment, Peter Bosch, Alessandro Duminuco, Sape Mullender, Jeff Napper, 22-Apr-2020
12. US-2021044623-A1, Dynamically tailored trust for secure application-service networking in an enterpris, Hendrikus G.P. Bosch, Sape Jurriën Mullender, Jeffrey Michael Napper, Alessandro Duminuco, Shivani Ragha, 6 May 2020
13. US-2020389393-A1, Systems and methods for routing network traffic using labels, Hendrikus G.P. Bosch, Stefan Olofsson, Ijsbrand Wijnands, Anubhav Gupta, Jeffrey Napper, Sape Jurriën Mullender, 23 Jan 2020
14. US-10904240-B2, System and method of verifying network communication paths between applications and services, Hendrikus G. P. Bosch, Alessandro Duminuco, Jeffrey Napper, David Delano Ward, Syed Khalid Raza, Sape Jurriën Mullender, 6 Dec 2019
15. WO-2019212831-A1, Managing multicast service chains in a cloud environment, Hendrikus Bosch, Jeffrey Napper, Andre Surcouf, Alessandro Duminuco, Subhasri Dhesikan, Sape Mullender, 24 Apr 2019
16. US-2020252374-A1, Method for policy-driven, classifying, and routing traffic using the domain name system, Peter Bosch, Alessandro Duminuco, Jeffrey Napper, Sape Jurriën Mullender, David Delano Ward, 2 Apr 2019
17. US-11012251-B2, Multicast flow scheduling in a data center, Hendrikus G. P. Bosch, Sape

Jurriën Mullender, IJsbrand Wijnands, Alessandro Duminuco, Jeffrey Michael Napper, Subhasri Dhesikan, 2 Oct 2018

18. US-11018886-B1, Methods and apparatus for selectively filtering an IP multicast data stream for selected group members of a multicast group, IJsbrand Wijnands, Hendrikus G. P. Bosch, Sape Jurriën Mullender, Subhasri Dhesikan, 20 Sep 2018
19. EP-3583756-A1, Système et procédé permettant de faciliter la distribution d'un contenu à des destinataires multiples dans un environnement de réseau, Hendrikus Bosch, Sape Jurriën Mullender, Keith Burns, Jeffrey Napper, William Mark Townsley, Alessandro Duminuco, Andre Surcouf, IJsbrand Wijnands, Humberto J. La Roche, 9 Feb 2018
20. US-10798187-B2, Secure service chaining, Sape Jurriën Mullender, Hendrikus G. P. Bosch, Alessandro Duminuco, Jeffrey Napper, 19 Jun 2017
21. US-10521273-B2, Physical partitioning of computing resources for server virtualization, Sape Mullender, David Richard Barach, Jim Mckie, Peter Bosch, 8 Jun 2017
22. US-10178646-B2, System and method to facilitate slice management in a network environment, Hendrikus G. P. Bosch, Humberto J. La Roche, Aeneas Sean Dodd-Noble, Sape Jurriën Mullender, Timothy P. Stammers, Konstantin Livanos, 12 Apr 2017
23. US-10313118-B2, Authenticated access to cacheable sensor information in information centric data network, Sape Jurriën Mullender, Hendrikus Bosch, David Lake, 27 Oct 2016
24. US-10218704-B2, Resource access control using named capabilities, Sape Jurriën Mullender, Hendrikus G. P. Bosch, Louis Gwyn Samuel, 6 Oct 2016
25. US-10361969-B2, System and method for managing chained services in a network environment, Hendrikus G. P. Bosch, Jeffrey Napper, Surendra M. Kumar, Alessandro Duminuco, Sape Jurriën Mullender, Humberto J. La Roche, Louis Gwyn Samuel, Frank Brockners, Shwetha Subray Bhandari, 30 Aug 2016
26. US-11044203-B2, System and method for hosting mobile packet core and value-added services using a software defined network and service chains, Hendrikus G. P. Bosch, Jeffrey Napper, Alessandro Duminuco, Humberto J. La Roche, Sape Jurriën Mullender, Surendra M. Kumar, Louis Gwyn Samuel, Bart A. Brinckman, Aeneas Sean Dodd-Noble, Luca Martini, 2 Jun 2016
27. US-10063468-B2, Leaking routes in a service chain, Hendrikus G. P. Bosch, Sape Jurriën Mullender, Jeffrey Napper, Surendra M. Kumar, Alessandro Duminuco, 15 Jan 2016
28. US-9357014-B2, Service-based networking, John Shamilian, Sape Jurriën Mullender, 29 Apr 2014
29. TW-201334489-A, 作業系統中故障偵測之方, Sape Mullender, 26 Sep 2012
30. EP-2637096-B1, A system for schedule and executing best-effort, real-time and high-performance computing (HPC) processes, Sape Mullender, James McKie, Jan Sacha, Henning Schild, Noah Evans, 7 Mar 2012
31. EP-2579546-B1, Procédé de détection de défaillances dans un système d'exploitation, Sape Mullender, 27 Sep 2011
32. US-9173201-B2, Method and base station system for providing access to a mobile communication network, Peter Bosch, Sape Mullender, 21 Sep 2011
33. US-9480090-B2, Method and system for optimising routing between two network nodes, at least one of which is mobile, Peter Bosch, Sape Mullender, Paul Polakos, Noah Evans, Georg Hampel,

Jim Mckie, 21 Sep 2011

34. US-8739306-B2, System and method for accessing private digital content, Hendrikus G.P. Bosch, Vladimir Y. Kolesnikov, Sape Mullender, Koen Daenen, Bart Antoon Rika Theeten, 23 Nov 2010
35. EP-2416251-B1, A method of managing computer memory, corresponding computer program product, and data storage device therefor, Sape Mullender, Jim Balmer McKie, Fabio Pianese, Noah Evans, 6 Aug 2010
36. US-8856544-B2, System and method for providing secure virtual machines, Peter Bosch, Vladimir Kolesnikov, Sape Mullender, Jim Mckie, Philippe Dobbelaere, Hubert McLellan, 16 Jul 2010
37. US-8451840-B2, Mobility in IP without mobile IP, Peter Bosch, Sape J. Mullender, Peter Schefczik, 4 Nov 2009
38. WO-2009070205-A1, Method and apparatus for delegation of secure operating mode access privilege from processor to peripheral, Peter Bosch, Hubert Rae McLellan, Sape Jurriën Mullender, 12 Nov 2008
39. US-2010029275-A1, Migration of TCP connections with layer 2 support in wireless environments, Peter Bosch, Mauricio Cortes, Tom J. Janiszewski, Jim B. McKie, Sape J. Mullender, Ajay Rajkumar, Michael C. Recchione, David A. Rossetti, Michael D. Turner, 31 Jul 2008
40. US-8296584-B2, Storage and retrieval of encrypted data blocks with in-line message authentication codes, Peter Bosch, Hubert Rae McLellan, Jr., Sape Jurriën Mullender, 28 Dec 2007
41. US-2008268853-A1, Method of sharing mobile unit state information between base station routers, Peter Bosch, Sape J. Mullender, Paul Anthony Polakos, Ajay Rajkumar, Ganapathy S. Sundaram, 30 Apr 2007
42. US-2008159324-A1, Method of providing data broadcast/multicast, Peter Bosch, Johann Galonska, Sape Mullender, 27 Dec 2006
43. US-2007271458-A1, Authenticating a tamper-resistant module in a base station router, Peter Bosch, Mark Kraml, Sape Mullender, Paul Polakos, Louis Samuel, 22 May 2006
44. EP-1686731-B1, Integrierte Basisstation und Verfahren zur Übermittlung von Datensätzen in einem Mobilfunknetz, Peter Bosch, Sape Mullender, Girija J. Narlikar, Louis Gwyn Samuel, Lakshman N. Yagati, 19 Jan 2006
45. US-2007147337-A1, Method of synchronizing with an uplink channel and a method of determining a propagation delay in a wireless communications system, Peter Bosch, Emad Farag, Sape Mullender, Alexander Nathues, Louis Samuel, 28 Dec 2005
46. US-2007010250-A1, Method of hard handover in a wireless communication system, Peter Bosch, Sape Mullender, Anil Rana, Louis Samuel, 7 Jul 2005
47. US-8111698-B2, Method of performing a layer operation in a communications network, Peter Bosch, Sape Mullender, Girija Narlikar, 31 Mar 2005
48. US-2006221965-A1, Method of transferring data packets in a communications network, Peter Bosch, Sape Mullender, Girija Narlikar, 31 Mar 2005
49. US-2005243748-A1, Band switching for coherent beam forming in full-duplex wireless communication, Peter Bosch, Sape Mullender, 30 Apr 2004 Peter Bosch, Alessandro Duminuco,



Jeff Napper, Sape Mullender, David Ward, Method for policy-driven, classifying, and routing traffic using the domain name system, US Patent 11115387, 11 Mar 2005

## **Awards**

Recipient Bell-Labs Team-Work Award 2009 (LTE Mobility Team)

Recipient Bell-Labs President's Award 2006 (Base Station Router)

Recipient Bell-Labs Team-Work Award 2005 (BSR Architecture Team)

Recipient Bell-Labs Team-Work Award 2004 (HSDPA Demonstration Team)

## **Publications**