

# Yaakov (Jonathan) Stein

## Positions (non-academic)

2021- present: **CTO**, [Allot Ltd.](#) Smart BU, Hod HaSharon, Israel

2011-2021: **CTO**, [RAD Data Communications](#), Tel Aviv, Israel  
Responsible for analysis of future technologies, core technology development and demos, IPR issues (portfolio and defense), standardization efforts, and [training courses](#)

2016- present: **Chairman of the Board**, [the Neptune Consortium](#)

2014-2016: **cofounder**, **Neptune** - the Israel Consortium for Network Programming  
**Cofounder** – from mid 2013 worked on defining scope and obtaining funding for consortium consisting of 10 corporations and 8 academic institutions researching SDN and NFV approaches to service provider networks  
**Board member** – signatory responsibilities, represent RAD on board  
**technical committee chair** – interface between academic research and working groups until 2015: **NFV WG chair** – coordinate all Network Functions Virtualization research

2000-2016: **Active participant**, [IETF](#)  
Authored dozens of drafts, co-author of 6 RFCs and contributor to 15 RFCs  
**Major contributor** to [PWE3](#) Working Group  
**Working Group Chair** of [TICTOC](#) Working Group (2008-2016)  
**Member** of the [Performance Metrics Directorate](#)

1999-2011: **Chief Scientist, and Head of Advanced Technologies Department**, [RAD Data Communications](#), Tel Aviv, Israel

|                     |  |
|---------------------|--|
| Chief Scientist:    | Responsible for tracking relevant scientific trends<br>Evaluation of new technologies<br>Formalization of communications protocols<br>Participation in standards committees (ITU-T, IETF, MEF, etc.)<br>IPR – drafting patents, evaluating patents and Open Source<br>Training courses and international conferences |
| Algorithm Research: | Digital Signal Processing (speech, fax, modem, telephony)<br>Timing recovery over packet networks<br>Packet application classification<br>Service performance estimation and enhancement<br>Telecommunications security algorithms   |
| Innovations:        | Responsible for technological innovations in company<br>Fast prototyping   |

1995-1998: **Advanced Technology Manager**

1997-1998: **Digital Signal Processing Manager, Comverse Information Systems**

(Now [Verint Systems](#)) Woodbury, New York

Responsible for the development of advanced modem intercept and speech processing DSP for law enforcement and call center applications  
Developed web-based highly compressed multimedia archive server

1998: **Scientific consultant**, [Symbol Technologies](#), Holtsville, NY

Developed prototype neural network for classification of bar-code images.

1989-1995: **Neural Network Applications Team-Leader, Efrat Future Technology Ltd.**

(Afterwards [Comverse Technology](#)) Tel Aviv, Israel

Developed state-of-the-art *OCR* (Optical Character Recognition) and *ASR* (Automatic Speech Recognition) applications based on neural network and artificial intelligence technologies

1986-1995: **Consultant to the Israel Ministry of Defense**

Advised in the fields of digital signal processing, pattern recognition and applications of artificial neural networks

Received (in 1991) *Israel Defense Award* (**פרס בטחון ישראל**) Israel's highest award for defense-related research

1986-1988: **Database Architect, Encyclopedia of the Holocaust**

Designed and implemented several large relational databases for author/translator tracking and payment logistics, terminology and geographical name consistency, and indexing of three language versions of a 4-volume encyclopedia.

1980-1985: **Officer in the 8200 unit of the Israel Defense Forces** (rank: Major)

Research scientist specializing in the exploitation of artificial intelligence techniques in digital signal processing for communications, radar, and command and control systems

Participated in a large number of projects that were operationally deployed

see also [LinkedIn profile](#)

## Academic

**Author of textbook: *Digital Signal Processing: A Computer Science Perspective***

Published by John Wiley and Sons, August 2000

<http://www.dspscsp.com/> <http://www.amazon.com/exec/obidos/ASIN/0471295469>

2008-now: **Member of editorial board, [International Journal of Network Management](#)**

1999-now: **Adjunct, Computer Science Department, [Tel Aviv University](#)**

Responsible for the following courses:

- [0368.3464: Digital Signal Processing Algorithms and Applications](#) (1<sup>st</sup> degree)
- [0510.6402: Fundamentals of Communications Networks](#) (2<sup>nd</sup> degree)
- [0368.4136: Digital Signal Processing for Computer Science Students](#) (2<sup>nd</sup> degree)
- [0368.4338: Advanced Seminar in DSP](#)

2002-2011: **Adjunct Professor of Computer Engineering, [Jerusalem College of Engineering](#)**

Responsible for the following course:

- [10049: Digital Signal Processing for Software Engineering students](#)

1995-1998: **Adjunct Professor of Computer Science, [Polytechnic University,](#)**

Farmingdale, New York.

Responsible for the following courses:

- [CS392: DSP for Computer Science students](#)
- [CS661: Artificial Intelligence](#)
- [CS662: Advanced AI](#)
- [CS667: Neural Networks](#)

Developed AI and NN specialties for MSc. students

Lectured to industry on uses of AI and neural networks

1986-1989: **PhD. in theoretical physics -- [Hebrew University of Jerusalem](#)**

Thesis: *Capacity of Neural Network Models*

1978-1979: **MSc. in theoretical physics - Hebrew University of Jerusalem**

Thesis: *Critical Temperature for Superconductivity in the Transition metals*

1974-1977: **BSc. in physics, math and computer science - Hebrew University of Jerusalem**

see also [ResearchGate profile](#)

## Talks and Conferences

- 2021: **Invited speaker:** IAB workshop on Network Quality [The Futility of QoS]
- 2019: **Invited speaker:** [MPLS+SDN+NFV World 2019](#) (Paris) [Aggregation/Disaggregation]
- 2018: **Keynote speaker:** [Israel DevCon](#) (Tel Aviv) [Abstraction in the Physical World]
- 2018: **Invited speaker:** [MPLS+SDN+NFV World 2018](#) (Paris) [ABCDE: the NFV Alphabet], and **panelist** [[SDN/NFV Hype or Reality](#), Blockchain]
- 2017: **Speaker:** [MEF17](#) (Orlando) [[QoS for Rich Communications Services](#)]
- 2017: **Invited speaker:** [MPLS+SDN+NFV World 2017](#) (Paris) [Virtual CPE Reality]
- 2016: **Invited speaker:** [MPLS+SDN+NFV World 2016](#) (Paris) [[EvolviNG CPE](#)]
- 2015: **Invited tutorial:** [IETF-93 \(Prague\)](#) [[SDN and NFV](#)]
- 2015: **Speaker:** [UTC Telecom & Technologies 2015](#) (Atlanta) [Migration to Packet Networks]
- 2015: **Speaker:** [Open Tech Israel SDN Symposium](#) (Tel Aviv) [SDN and NFV: The Five Trends]
- 2015: **Invited speaker:** [MPLS and SDN World Conference 2015](#) (Paris) [Lifecycle Assurance with vCPE]
- 2014: **Invited speaker:** [MPLS and SDN World Conference 2014](#) (Paris) [*D-NFV*], and **panelist** [Virtualization]
- 2013: **Invited speaker:** [MPLS and Ethernet World Conference 2013](#) (Paris) [QoSDN], and **panelist** [SDN]
- 2012: **Invited speaker:** [MPLS and Ethernet World Conference 2012](#) (Paris) [Comparing Access Packet-based Technologies [Part1](#), [Part2](#)] and panelist [MPLS End-to-End]
- 2011: **Invited speaker:** [MPLS and Ethernet World Conference 2011](#) (Paris) [OAM: Application Driven Evolution]
- 2010: **Invited Speaker:** [Ethernet Wholesale Summit](#) (Paris) [Timing over Packet Networks]
- 2008: **Speaker:** [TI Worldwide Developer Conference](#) [Cellular Backhaul Optimization]
- 2007: **Speaker:** [ITSF-2007](#) [Delivering Better Time-of-Day Using Synchronous Ethernet and 1588]
- 2004: **Invited speaker:** Communications Design Conference (San Francisco)  
<http://www.commdesignconference.com/archive/papers/2004/P826.htm>
- 2001: **Chair and speaker:** Seminar on Access Networks (Kfar HaMaccabiah, Tel Aviv)
- 2001: **Invited speaker:** R&D-2001 [mark-up languages] (Tel Aviv)
- 2000: **xDSL track chair and 1/2-day tutorial:** [DesignCon2000](#) (Santa Clara, California)
- 2000: **Invited speaker:** DSP-2000 [xDSL] (Tel Aviv)
- 2000: **Speaker:** Telecommunications-2000 (Tel Aviv) [Perceptual Speech Quality]
- 1995: **Invited speaker:** 18<sup>th</sup> Convention IEEE Israel [Advances in Speech Recognition]
- 1994: **OCR session chair** at the [12<sup>th</sup> International Conference on Pattern Recognition](#)
- 1993: **Co-chair and organizer** of the [10<sup>th</sup> annual Israel AICVNN conference \(proceedings\)](#)

## Standardization Efforts

**Co-chair** of [IETF TICTOC](#) Working Group

Regularly participated in [IETF](#) and [ITU-T](#) meetings

Occasionally participated in [MEF](#), [ETSI](#), [ANSI](#), IP/MPLS (was MFA) Forum, DSL-forum

**IETF:** Coauthor of RFCs 4553, 5087, 5287, 5920, 6310, 7893, and numerous Internet Drafts

Contributed to RFCs 3916, 4197, 4385, 4733, 4734, 4901, 5244, 5611, 5885, and 6669

**ITU-T** Editor of Y.1413, Y.1418, Y.1452, Y.1453; major contributor to Y.1414, Y.1415, Y.1731

## **Selected Publications and Patents** (see also <http://www.dspsp.com/pubs>)

Yaakov Stein (October 2021)  
Time Sensitive Network Programming  
[US Patent 11,146,485](#)

Yaakov Stein (September 2021)  
*The Futility of QoS*  
[Preprint IAB virtual workshop on Measuring Network Quality for End-Users](#)

Yaakov Stein, Yuri Gittik and Ron Insler (December 2020)  
*Transport Network Aspects* book chapter in [5G RAN Architecture: The Dark Side of 5G](#) Sasha Sirotkin (ed.)  
John Wiley and Sons, NY  
[Preprint](#)

Yzhak Sorani and Yaakov Stein (August 2020)  
*Hardware Micro-services Platform*  
[US Patent 10,754,666](#)

Yaakov Stein (August 2020)  
*Pan-Zoom Entry of Text*  
[European Patent 3,308,248](#)

Gabriel Zigelboim, Alon Geva, and Yaakov Stein (October 2017)  
One-Way Packet Delay Measurement  
[US Patent 9,787,461](#)

YJ. Stein, D. Black, B. Briscoe (June 2016)  
*PW Congestion Considerations*  
[RFC 7893](#)

Yaakov Stein, Ron Insler, and Alon Geva (June 2016, July 2018)  
*Triangle Loopback*  
US patents [9,369,362](#) and [10,021,006](#)

Alon Geva and Yaakov Stein (March 2016)  
*Pluggable Master Clock*  
[US Patent 9,276,689](#)

Yaakov Stein (07/2015)  
*SDN, NFV, and All That*  
[IETF Journal, Volume 11, Issue 1, pp. 11-14](#)

Alon Geva, Gabriel Zigelboim, and Yaakov Stein (March 2015, December 2016)  
*Timing over Packet Demarcation Entity*  
US patents [8,971,356](#) and [9,525,502](#)

Yaakov Stein et al. (July 2013)  
*Accessing Cloud Services*  
[draft-stein-cloud-access-03](#)

N. Sprecher et al. (July 2012)  
*An Overview of the OAM Toolset for MPLS-Based Transport Networks*  
[RFC 6669](#)

Alon Geva, Ehud Malik, and Yaakov Stein (November 2011)  
*High Quality Timing Distribution over DSL without NTR Support*  
US patents [8068430](#) and [8,660,150](#)

M. Aissaoui et al (April 2011)  
*Pseudowire (PW) OAM Message Mapping*  
[RFC 6310](#)

L. Fang et al. (July 2010)  
*Security Framework for MPLS and GMPLS Networks*  
[RFC 5920](#)

Yaakov Stein (April 2009)  
*The Value of Being Linked In*  
[Preprint](#)

A. Vainshtein and YJ. Stein (August 2008)  
*Control Protocol Extensions for the Setup of TDM Pseudowires in MPLS Networks*  
[RFC 5287](#)  
Yaakov Stein (editor) (02/2008)  
*Pseudowire layer network*  
[ITU-T Recommendation Y.1418](#)

Yaakov (J) Stein (February 2008)  
*Cellular Backhaul Optimization: Cost effective approaches for Base Station Backhaul*  
[TI Worldwide Developer Conference \(Dallas, TX\) slides](#)

Y(J). Stein, R. Shashoua, R. Insler, and M. Anavi (December 2007)  
*Time Division Multiplexing over IP (TDMoIP)*  
[RFC 5087](#)

Yaakov (J) Stein, Alon Geva, and Gabriel Zigelboim (November 2007)  
*Delivering Better Time-of-Day Using Synchronous Ethernet and 1588*  
[ITSF-2007 \(London\) slides](#)

A. Vainshtein and YJ. Stein (June 2006)  
*Structure-Agnostic Time Division Multiplexing (TDM) over Packet (SAToP)*  
[RFC 4553](#)

Yaakov Stein (editor) (03/2006)  
*TDM-IP interworking - User plane interworking*  
[ITU-T Recommendation Y.1453](#)

Yaakov Stein (editor) (03/2006)  
*Voice trunking over IP networks*  
[ITU-T Recommendation Y.1452](#)

Yaakov Stein and Brian Stroehlein (2006)  
*Using Synchronization over PSN – Does IEEE 1588 Really Make a Difference?*  
NIST-ATIS Workshop on Synchronization in Telecommunication Systems ([WSTS '06](#))

Hugo Silberman, Tsvi Eitane, and Yaakov Stein (December 2004)  
*System and method for extending the range of xDSL services*  
[US Patent 6829246](#)

Yaakov Stein (editor) (03/2004)  
*TDM-MPLS network interworking - User plane interworking*  
[ITU-T Recommendation Y.1413](#)

Yaakov Stein (2004)  
*The Wonders of Digital Processing* (in Hebrew)  
[Galileo](#), vol 66, Feb 2004

Yaakov Stein and Eitan Schwartz (2001)  
*An Evolutionary Approach to Transporting Voice and Legacy Data over IP Networks*  
[Carriers world](#), 16/03/2001

Yaakov Stein (2001)  
*Extension of Telephone Services in an IP Network* (in Chinese)  
China Computer World, Nov. 5, 2001

Yaakov Stein and Eitan Schwartz (2000)  
*Ever thought about extending circuits over IP?*  
Telecommunications, Nov 2000 pp 89-94

Yaakov Stein and Eitan Schwartz (2000)  
*TDMoIP: An Evolutionary Approach to Transporting Voice over IP Networks* (in Russian)  
Networks and Communications Systems, Sept 2000 pp 96-101 <http://ccc.ru/magazine>

J. Y. Stein (2000)  
***Digital Signal Processing - a Computer Science Perspective***  
John Wiley and Sons, NY, ISBN 0471295469  
<http://www.dspsp.com> <http://www.amazon.com/exec/obidos/ASIN/0471295469/>

J. Y. Stein (2000)  
*TecForum - Tutorial on xDSL*  
DesignCon2000, Santa Clara, California  
<http://www.designcon.com/2000/tecforum.html> - TFA6

Yaakov Stein (1994)  
*A Review of 'Minimum Classification Error' Training*  
[Efrat Future Technologies Technical Report](#)

Yaakov Stein (1994)  
*Neurons - Together they do Everything* (in Hebrew)  
[Computers Jan. 1994](#)

Y. Stein (1993)  
*False Alarm Reduction for ASR and OCR*  
[Proc. 10<sup>th</sup> IAICVNN](#), 195-200.

Y. Stein (1993)

*Hyperplane Training of a Hypersphere Classifier*  
[Proc. 10<sup>th</sup> IAICVNN](#), 291-296.

R. Aloni-Lavi, Y. Metzger and Y. Stein (1992)

*A BP Variant with Improved Convergence and Generalization*  
International Joint Conference on Neural Networks (Baltimore) I-932 - I-937  
<https://www.amazon.com/exec/obidos/ASIN/0780305590/>

Y. Stein (Dec 1990)

*Storage Capacity for Neural Network Models* (in Hebrew)  
PhD. Thesis, Hebrew University of Jerusalem - Theoretical Physics

H. Gutfreund and Y. Stein (1990)

*Capacity of Neural Networks with Discrete Synaptic Couplings*  
[J. Phys. A \(Math. Gen.\) 23, 2613-2630.](#)

H. Gutfreund and Y. Stein (1989)

*Neural Networks with Discrete Synaptic Couplings*  
[STATPHYS 17 \(Porto Alegre, Brazil\)](#)

H.J. Sommers, A. Crisanti, H. Sompolinsky and Y. Stein (1988)

*Spectrum of Large Random Asymmetric Matrices*  
[Phys. Rev. Lett. 60, 1895-1898.](#)

Y. Stein (1983)

*Two Dimensional Euclidean Regression*  
Conference on Computer Mapping (Herzeliya, Israel) ([preprint](#))

Y. Stein (1981)

*A Short Note Concerning Planiversal Solid State Physics*  
[First Symposium on Two-Dimensional Science and Technology](#) (ed. AK Dewdney) 90-91.

Y. Stein (1981)

*Maxwell's Equations in Two Dimensions*  
[First Symposium on Two-Dimensional Science and Technology](#) (ed. AK Dewdney) 28-33.

Y. Stein (June 1979)

*Critical Temperature for the Onset of Superconductivity in the Transition Metals* (in Hebrew)  
[MSc. Thesis](#), Hebrew University of Jerusalem - Theoretical Physics