

# CURRICULUM VITAE

AMOS RON

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## PERSONAL INFORMATION

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## EDUCATION

1974-1977 B.Sc (Magna Cum Laude) Tel-Aviv University.  
1977-1980 M.Sc. (Summa Cum Laude) Tel-Aviv University.  
Title of Master's Thesis "On the interpolation problem in  $\mathbb{R}^1$  and  $\mathbb{R}^2$ ".  
Name of Supervisor: Professor Amnon Jakimovski.  
1983-1987 Ph.D. (Summa Cum Laude) Tel-Aviv University.  
Title of Doctoral Dissertation "Exponential box splines and other types of non-polynomial B-splines".  
Name of Supervisors: Professor Nira Dyn, Professor Amnon Jakimovski

## POSITIONS HELD

1987-1988 Visiting Assistant Professor, Mathematics Department, Texas A&M University  
1988-1990 Visiting Assistant Professor, CS Department, University of Wisconsin-Madison  
1990-1993 Assistant Professor, CS and Math. Depts., University of Wisconsin-Madison  
1993-1998 Associate Professor, CS and Math. Depts., University of Wisconsin-Madison  
1998- Professor, CS and Math. Depts., University of Wisconsin-Madison  
1994, Summer Visiting Associate Professor, Technion, Haifa, Israel  
1996, Spring Visiting Associate Professor, Tel-Aviv University, Tel-Aviv, Israel  
1997, Summer Visiting Senior Research Assoc., National University of Singapore, Singapore  
1998, Summer Visiting Professor, National University of Singapore, Singapore  
2002-2003 Visiting Professor, the Industrial Math. Institute, University of S. Carolina  
2002- Visiting Distinguished Professor, National University of Singapore, Singapore

## **SUPPORTING AGENCIES (last eight years)**

National Science Foundation, DMS  
06-09, PI

National Institute of Health, National Institute of General Medical Sciences  
04-08, PI

University of Wisconsin, Vilas Associate award  
04-06, PI

National Science Foundation, ITR award  
00-05, PI

National Science Foundation, KDI award  
98-03, PI

National Science Foundation, Division of Biological Infrastructure  
00-03, co-PI

The United States Army Research Office  
98-01, co-PI

## **OTHER PROFESSIONAL ACTIVITIES (last eight years)**

- 1998- Coordinator, The Wavelet IDR Center ([www.waveletidr.org](http://www.waveletidr.org))
- 2000 Organizer, The IDR Post-Doc Marathon, Madison, Wisconsin.
- 2000 Organizer, An IDR/networking Workshop, Palo Alto, California
- 2001 Organizer, A joint IDR-IMA Workshop, Minneapolis, Minnesota.
- 2002 Organizer, An IDR Marathon Workshop, Columbia, South Carolina.
- 2003 Organizer, Constructive Mathematics: A meeting honoring C. de Boor, Dagstuhl, Germany.
- 2004 Co-chair, an annual program on *Mathematics and Computation in Imaging Science and Information Processing*, National University of Singapore
- 2007 Panelist  
National Science Foundation, Science Foundation Ireland

## **EDITORIAL WORK**

Journal of Approximation Theory, Editor, 96–99; Editor-in-Chief, 00–  
Constructive Approximation, Editor, 96–  
Applied and Computational Harmonic Analysis, Editor, 99–  
SIAM Journal of Math. Analysis, Editor, 99–05  
Sampling Theory in Signal and Image Processing, Editor, 05–  
Advances in Adaptive Data Analysis, Editor, 07–

## **Ph.D. STUDENTS**

1. Michael J. Johnson, graduated: May 1995.
2. Thomas A. Hogan, graduated: May 1996.
3. Jungho Yoon, graduated: December 1998.
4. Steven Parker, graduated: December 2004.
5. H. Narfi Stefansson, graduated: December 2004.
6. Julia Velikina, graduated: August 2003.
7. Thomas Hangelbroek, graduated: August 2007.
8. Jeff Kline, current.
9. Youngmi Hur, graduated: June 2006.
10. Sangnam Nam, graduated: August 2008.
11. Yeon Hyang Kim, graduated: May 2008.

## **LIST OF PUBLICATIONS**

### **Theses**

- A. Ron  
On the interpolation problem in  $\mathbb{R}^1$  and  $\mathbb{R}^2$   
M.Sc. Thesis, Tel-Aviv University 1980.
- A. Ron  
Exponential box splines and other types of non-polynomial B-splines  
Ph.D. Thesis, Tel-Aviv University 1987.

### **Invited Surveys**

1. A. Ron  
Wavelets and their associated operators  
Approximation Theory IX Vol. II, C. K. Chui, L. L. Schumaker, Vanderbilt University  
Press (1998), 283–317.

2. A. Ron  
Introduction to Shift-Invariant Spaces: Linear Independence  
Multivariate Approximation and Applications, A. Pinkus, D. Leviatan, N. Dyn, and  
D. Levin (eds.), Cambridge University Press (Cambridge) (2001), 112–151.

### Articles in Journals

3. A. Ron  
Exponential box splines  
Constructive Approximation **4**(1988), 357–378.
4. N. Dyn, A. Ron  
Cardinal translation invariant Tchebycheffian B-splines  
Journal of Approximation and Its Applications **6:2**(1990), 1–12.
5. N. Dyn, A. Ron  
Periodic exponential box splines on a three directional mesh  
Journal of Approximation Theory **56**(1989), 287–296.
6. A. Ron  
Linear independence of the translates of an exponential box spline  
Rocky Mountain Journal of Mathematics **22**(1992), 331–351.
7. N. Dyn, A. Ron  
Recurrence relations for Tchebycheffian B-splines  
Journal d'Analyse Mathématique **51**(1988), 118–138.
8. A. Ben-Artzi, A. Ron.  
Translates of exponential box splines and their related spaces  
Transactions of Amer. Math. Soc. **309**(1988), 683–710.
9. A. Ron  
A necessary and sufficient condition for the linear independence of the integer translates of a compactly supported distribution  
Constructive Approximation **5**(1989), 297–308.
10. N. Dyn, A. Ron  
Local approximation by certain spaces of exponential polynomials, approximation order of exponential box splines and related interpolation problems  
Transactions of Amer. Math. Soc. **319**(1990), 381-404.
11. A. Ron  
Relations between the support of a compactly supported function and the exponential-polynomials spanned by its integer translates  
Constructive Approximation **6**(1990), 139–155.
12. C. K. Chui, A. Ron  
On the convolution of a box spline with a compactly supported distribution: linear independence for the integer translates  
Canadian Journal of Mathematics **4(1)**(1991), 19–33.

13. C. de Boor, A. Ron  
On multivariate polynomial interpolation  
*Constructive Approximation* **6**(1990), 287–302.
14. A. Ron  
On the convolution of a box spline with a compactly supported distribution: the exponential-polynomials in the linear span  
*Journal of Approximation Theory* **66(3)** (1991), 266–278.
15. C. de Boor, A. Ron  
On ideals of finite codimension and applications to box splines theory  
*Journal of Mathematical Analysis and its Applications* **158** (1991), 168–193.
16. A. Ron  
Factorization Theorems for univariate splines on regular grids  
*Israel Journal of Mathematics* **70** (1990), 48–68.
17. C. de Boor, N. Dyn, A. Ron  
On two polynomial spaces associated with a box spline  
*Pacific Journal of Mathematics* **147** (1991), 249–267.
18. A. Ben-Artzi, A. Ron  
On the integer translates of a compactly supported function: dual bases and linear projectors  
*SIAM Journal of Mathematical Analysis* **21** (1990), 1550–1562.
19. N. Dyn, I.R.H. Jackson, D. Levin, A. Ron  
On multivariate approximation by the integer translates of a basis function  
*Israel Journal of Mathematics* **78** (1992), 95–130.
20. C. de Boor, A. Ron  
The exponentials in the span of the integer translates of a compactly supported function  
*Journal of the London Mathematical Society* **45** (1992), 519–535.
21. A. Ron  
A characterization of the approximation order of multivariate spline spaces  
*Studia Mathematica* **98(1)** (1991), 73–90.
22. C. de Boor, A. Ron  
Computational aspects of polynomial interpolation in several variables  
*Mathematics of Computations* **58(198)** (1992), 705–727.
23. C. de Boor, A. Ron  
The least solution for the polynomial interpolation problem  
*Math. Z.* **210** (1992), 347–378.
24. A. Ron  
Remarks on the linear independence of the integer translates of exponential box splines  
*Journal of Approximation Theory* **71(1)** (1992), 61–66.

25. A. Ron, N. Sivakumar  
The approximation order of box splines spaces  
Proceedings of Amer. Math. Soc. **117** (1993), 473–482.
26. C. de Boor, A. Ron  
Fourier analysis of approximation power of principal shift-invariant spaces  
Constructive Approximation **8** (1992), 427–462.
27. C. de Boor, R. DeVore, A. Ron  
Approximation from shift-invariant subspaces of  $L_2(\mathbb{R}^d)$   
Transactions of Amer. Math. Soc. **341** (1994), 787–806
28. C. de Boor, R. DeVore, A. Ron  
The structure of finitely generated shift-invariant subspaces of  $L_2(\mathbb{R}^d)$   
J. Functional Anal. **119** (1994), 37–78.
29. C. de Boor, R. DeVore, A. Ron  
On the construction of (pre)wavelets  
Constructive Approximation, Special Issue on Wavelets **9** (1993), 123–166.
30. C. de Boor, A. Ron, Z. Shen  
On ascertaining inductively the dimension of the joint kernel of certain commuting linear operators  
Advances in Applied Mathematics. **17** (1996), 209–250.
31. A. Ron  
Negative observations concerning approximations from spaces generated by scattered shifts of functions vanishing at  $\infty$   
Journal of Approximation Theory **78** (1994), 364–372.
32. N. Dyn, A. Ron  
Multiresolution analysis generated by infinitely differentiable compactly supported functions  
Applied and Computational Harmonic Analysis **2**, 15–20 (1995).
33. A. Ron  
Approximation orders of and approximation maps from local principal shift-invariant spaces  
Journal of Approximation Theory **81(1)** (1995), 38–65.
34. N. Dyn, A. Ron  
Radial basis functions approximation: from gridded centers to scattered centers  
Proc. London Math. Soc. **71 (3)** (1995), 76–108.
35. A. Ron, X. Sun  
Strictly positive definite functions on spheres  
Math. Comp. **65 (216)** (1996), 1513–1530.

36. A. Ron, Z. Shen  
 Frames and stable bases for shift-invariant subspaces of  $L_2(\mathbb{R}^d)$   
 Canadian J. Math. **47** (1995), 1051–1094.
37. A. Ron, Z. Shen  
 Weyl-Heisenberg frames and Riesz bases in  $L_2(\mathbb{R}^d)$   
 Duke Math. J. **89** (1997), 237–282.
38. A. Ron  
 Smooth refinable functions provide good approximation orders  
 SIAM J. Math. Anal. **28** (1997), 731–748.
39. A. Cohen, I. Daubechies, A. Ron  
 How smooth is the smoothest function in a refinable space (a note)  
 Applied and Comp. Harmonic Analysis **3** (1996), 87–89.
40. C. de Boor, A. Ron, Z. Shen  
 On ascertaining inductively the dimension of the joint kernel of certain commuting  
 linear operators II  
 Advances in Mathematics **123** (1996), 223–242.
41. A. Ron, Z. Shen  
 Affine systems in  $L_2(\mathbb{R}^d)$ : the analysis of the analysis operator  
 Journal of Functional Analysis **148** (1997), 408–447.
42. A. Ron, Z. Shen  
 Compactly supported tight affine spline frames in  $L_2(\mathbb{R}^d)$   
 Math. Comp. **67**(221) (1998), 191–207.
43. C. de Boor, R. DeVore, A. Ron  
 Approximation orders of FSI spaces in  $L_2(\mathbb{R}^d)$   
 Constructive Approximation **14** (1998), 631–652.
44. K. Gröchenig, A. Ron  
 Tight compactly supported wavelet frames of arbitrarily high smoothness  
 Proc. Amer. Math. Soc. **126** (1998), 1101–1107.
45. A. Ron, Z. Shen  
 The Sobolev regularity of refinable functions  
 J. Approx. Theory **106** (2000), 185–225.
46. A. Ron, Z. Shen  
 Affine systems in  $L_2(\mathbb{R}^d)$  II: dual systems.  
 J. Fourier Analysis and Applications, Special issue on *frames* **3** (1997), 617–637.
47. G. Plonka, A. Ron  
 A new factorization technique of the matrix mask of univariate refinable functions  
 Numerische Math. **87** (2001), 555–595

48. C. de Boor, N. Dyn, A. Ron  
Interpolation on flats in  $\mathbb{R}^d$   
J. Approx. Theory **105** (2000), 313–343;
49. A. Ron, Z. Shen, K.-C. Toh  
Computing the Sobolev regularity of refinable functions by the  
Arnoldi Method  
SIAM J. Matrix Anal. Applic. **xx** (200x), xxx–xxx;
50. Ingrid Daubechies, Bin Han, Amos Ron, Zuowei Shen  
Framelets: MRA-based constructions of wavelet frames  
Applied and Computational Harmonic Analysis **14(1)** 2003, 1-46.
51. Amos Ron, Zuowei Shen  
The Wavelet Dimension Function is The Trace Function of A  
Shift-Invariant System  
Proc. Amer. Math. Soc., **131 (5)** 2003, 1385–1398.
52. Amos Ron, Zuowei Shen  
Generalized shift-invariant systems  
Constructive Approximation **22** (2005), 1–45.
53. Olga Holtz, Amos Ron  
Approximation orders of shift-invariant subspaces of  $W_2^s(\mathbb{R}^d)$   
Journal of Approximation Theory **132** (2005), 97–148.
54. Youngmi Hur, Amos Ron  
CAPlets: wavelet representations without wavelets  
submitted
55. Youngmi Hur, Amos Ron  
New constructions of piecewise-constant wavelets  
ETNA, Special Volume on Constructive Function Theory **25** (2006), 138–157.
56. Youngmi Hur, Amos Ron  
L-CAMP: extremely local high-performance wavelet representations  
in high spatial dimension  
IEEE Transactions on Information Theory **54(5)** (2008), 2196–2209.
57. Yeon Hyang Kim, Amos Ron  
Time frequency representations of almost-periodic functions  
Constructive Approximation **29** (2009), 303–323.
58. Carl de Boor, Amos Ron  
Box splines revisited: convergence and acceleration methods for the subdivision and  
the cascade algorithms  
Journal of Approximation Theory **150** (2008), 1–23.
59. Olga Holtz, Amos Ron  
Zonotopal algebra  
submitted

- 60. Ronald DeVore, Amos Ron  
Approximation using scattered shifts of a multivariate function  
Trans. Amer. Math. Soc., to appear.
- 61. Olga Holtz, Amos Ron, Zhiqiang Xu  
Hierarchical zonotopal spaces function  
Trans. Amer. Math. Soc., to appear.
- 62. Thomas Hangelbroek, Amos Ron  
Nonlinear Approximation Using Gaussian Kernels function  
Journal of Functional Analysis, to appear.

### Articles outside Mathematics

- 63. Paul Barford, Jeffrey Kline, David Plonka, Amos Ron  
A signal analysis of network traffic anomalies  
Proceedings of Internet Measurement Workshop, 2002
- 64. Eliceiri KW, Thomas C, Rueden C, Stefansson N, Peterson L, Lu FM, Chu V, Ron A, White JG  
CAMBIO: Computational algorithms for multidimensional biological image organization.  
Developmental Biology **247 (2)**, (2002), xxx-xxx.
- 65. Stefansson, H.N., Eliceiri, K.W., Thomas, C.F., Ron, A., DeVore, R., Sharpley R., and J.G. White  
Wavelet Compression of Three-Dimensional Time-lapse Biological Image Data  
Microscopy and Microanalysis **11**, (2005), 9–17.
- 66. Sommers, J., Barford, P., Ron, A., and Willinger, W.  
Phase Plot-based Analysis of Internet Packet Traffic Dynamics
- 67. Joel Sommers, Paul Barford, Nick Duffield, and Amos Ron  
Improving Accuracy in End-to-End Packet Loss Measurement  
Proceedings of ACM SIGCOMM 05, Philadelphia, PA., August 2005.
- 68. Joel Sommers, Paul Barford, Nick Duffield, and Amos Ron  
A Geometric Method to Improving Active Packet Loss Measurement  
IEEE/ACM Transactions on Networking, **16(2)** (2008), 307–320.
- 69. J. Sommers, P. Barford, N. Duffield and A. Ron.  
Multi-objective Monitoring for SLA Compliance  
To appear in IEEE INFOCOM (Minisymposium), 2007.
- 70. Joel Sommers, Paul Barford, Nick Duffield, and Amos Ron  
Accurate and efficient SLA compliance monitoring  
Proceedings of ACM SIGCOMM 07, Koyoto, Japan, August 2007.
- 71. Jeffery Kline, Jeffrey Hoch, and Amos Ron  
Window Functions with Optimal Sensitivity for Defined Resolution Enhancement  
submitted, 2007.

## Other Articles

72. N. Dyn, A. Ron  
On multivariate polynomial interpolation  
Algorithms for approximation II, J. C. Mason, M. G. Cox eds., Chapman and Hall, London, (1990), 177–184.
73. C. de Boor, A. Ron  
The limit at the origin of a smooth function space  
Approximation Theory VI, C. K. Chui, L. L. Schumaker and J. D. Ward eds., Academic Press New York, (1989), 93–96.
74. C. de Boor, A. Ron  
Polynomial ideals and multivariate splines  
Multivariate approximation Theory V, W. Schempp & K. Zeller eds., Birkhäuser, Basel (1990), 31–40.
75. A. Ron  
The  $L_2$ -Approximation orders of principal shift-invariant spaces generated by a radial basis function  
Numerical Methods of Approximation Theory Vol. 9, D. Braess & L.L. Schumaker eds., International Series of Numerical Mathematics Vol. 105, Birkhäuser Verlag, Basel, 1992, 245–268.
76. A. Ron  
Characterizations of linear independence and stability of the shifts of a univariate refinable function in terms of its refinement mask  
CMS Tech. Rep. 93-3, University of Wisconsin-Madison, Sept. 92.
77. M.D. Buhmann, A. Ron  
Radial Basis functions:  $L_p$ -approximation orders with scattered centers  
*Curves and Surfaces II*, P.J. Laurent, A. Le Méhauté and L.L. Schumaker, eds., AKPeters, Boston, 1994, 93–112.
78. A. Ron, Z. Shen  
Frames and stable bases for subspaces of  $L_2(\mathbb{R}^d)$ : the duality principle of Weyl-Heisenberg sets  
In *Proceedings of the Lanczos International Centenary Conference* Raleigh, NC, 1993. D. Brown, M. Chu, D. Ellison, and R. Plemmons eds., SIAM Pub. (1994), 422–425
79. A. Ron, Z. Shen  
Gramian analysis of affine bases and affine frames  
In *Proceedings of the Eighth Texas Meeting on Approximation Theory* Charles K. Chui and Larry L. Schumaker eds., World Scientific Publishing.
80. M.D. Buhmann, C.A. Micchelli, A. Ron  
Asymptotically Optimal Approximation and Numerical Solutions of Differential Equations

In *Powell Festschrift*, (A. Iserles and M.D. Buhmann, eds), Cambridge University Press, 1997, 59–83.

81. A. Ron, Z. Shen

Construction of Compactly Supported Affine Frames in  $L_2(\mathbb{R}^d)$ ,  
In *Advances in Wavelets*, K. S. Lau (ed.), Springer Verlag, 1998, 27–50.