**Erell, Evyatar** March 2021

# CURRICULUM VITAE AND LIST OF PUBLICATIONS

## PERSONAL DETAILS


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|---|---|
| Name: | **Evyatar Erell** |
| Date and place of birth: | May 16, 1955. Washington, D.C., USA |
| Date of immigration: | March, 1961 |
| Address at work: | Dept. of Geography and Environmental Development, Ben-Gurion University of the Negev (BGU), Israel. Tel: (972)8-6596878, (972)8-6428498 |
| Address at home: | 2 Khod Akev St., P.O. Box 93, 8499000 Midreshet Ben-Gurion, Israel. Tel: (972)8-6532277 |
| ORCID iD | 0000-0003-0855-3745 |


## EDUCATION

B.Arch.T.Pl. 1986 – Bachelor of Architecture and Town Planning, Technion - Israel Institute of Technology, Faculty of Architecture and Town Planning.

M.A. 1995 – Master of Arts in Geography, Ben-Gurion University of the Negev, Dept. of Geography and Environmental Planning.

Advisor: Haim Tsoar. Thesis: The Effect of Buildings on the Deposition of Dust in a Desert City.

Ph.D. 2005 – Doctor of Philosophy in Architecture, University of Adelaide, Faculty of the Professions, School of Architecture, Landscape Architecture and Urban Design.

Advisors: Terence Williamson, Veronica Soebarto. Thesis: Predicting Air Temperature in City Streets on the Basis of Measured Reference Data.

## EMPLOYMENT HISTORY

2020- Dept. of Geography and Environmental Development, Ben-Gurion University of the Negev. Full Professor.

2018-2020 Dept. of Geography and Environmental Development, Ben-Gurion University of the Negev.

2015-2016 School of Architecture, Carnegie Mellon University, PA: Visiting researcher (non-remunerative, on sabbatical leave from BGU).

2011-2012 Dept. of Mechanical and Material Engineering, Portland State University, OR: Associate Prof (non-remunerative, on sabbatical leave from BGU).

2005-2018 The Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev. Associate Professor

1999-2000 The School of Architecture, Landscape Architecture and Town Planning, The University of Adelaide, Australia: Guest lecturer (non-remunerative, on sabbatical leave from BGU).

1995-2007 Researcher Grade B. The Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev.

1987-1995 Researcher Grade D. The Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev.

1986-1987 Research Technician. The Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev.

## PROFESSIONAL ACTIVITIES

### *(a) Positions in academic administration*

2013-2015 Member, BGU Academic Regulations Committee

2009-2011 Member, BGU Green Council

2006-2011 Member, steering committee of the Blaustein Center for Scientific Cooperation

1998-1999 Acting Head, Center for Desert Architecture and Urban Planning, The Jacob Blaustein Institute for Desert Research, Ben-Gurion University of the Negev.

1997-1998 Member, steering committee of the Blaustein International Center

1991-1992 Acting Head, Desert Architecture Unit, The Jacob Blaustein Institute for Desert Research, Ben-Gurion University of the Negev.

### *(b) Professional functions outside universities/institutions*

2020- member, Israel Standards Institute Expert committee 6204.20 – Building Energy Standards

2017- head, Israel Standards Institute Expert Sub-committee 5113.26 – Energy Labeling of Windows

2012- head, Israel Standards Institute Expert Sub-committee 2203.05 – Energy Performance of Building Envelopes

2012- member, Association of Heating, Refrigeration and Airconditioning Engineers (ASHRAE) - Standing Standard Project Committee 169 (SSPC 169): Weather Data for Building Design Standards

2010-2011 head, Israel Standards Institute Expert Sub-committee 2203.01 – Sensible Heat Flow Calculation in Buildings

2010-2011 member, Israel Standards Institute Expert Sub-committee 1204.03 – Sustainable Building - Energy

2010- member, Israel Standards Institute Committee 2203 - Energy in Buildings

2008-2009 member, Israel Standards Institute Expert Sub-committee 113.19 – Energy Labeling of Windows

2007- member, Association of Heating, Refrigeration and Airconditioning Engineers (ASHRAE) - Technical Committee TC4.2: Climate data.

2004-2011 member, Israel Standards Institute Expert Sub-committee 1204.01 – Energy Labeling of Buildings

2002-2011 member, Israel Standards Institute Expert Sub-committee 114.02 – Insulation Properties of Building Materials

2001-2002 member, Israel Standards Institute Expert Sub-committee 114.01 – Classification of Settlements to Climate Zones

2001-2011 member, Israel Standards Institute Expert Sub-committee 114.03 – Thermal Insulation of Buildings

2001-2011 member (head, 2007-2011), Israel Standards Institute Committee 114 - Thermal Insulation of Buildings

***(c) Significant professional consulting***

2020 Scientific consultant to Geo-Teva on a study of the effect of vegetation on microclimate and electricity output of large photovoltaic farms, funded by the Israel Electric Corporation.

2019 City of Tel Aviv. Establishing an urban microclimate monitoring network.

2009 Shikun Ovdim. Consultant on design of downdraft cool towers in the 7$^{th}$ Avenue shopping mall.

2008 Israel Institute of Standards. Draft standard for energy labelling of fenestration products in buildings.

1999-2001 Israel Ministry of Construction and Housing. Climate and energy consultant for the new masterplan of Dimona (with Meir, I. and Etzion, Y.).

1999-2000 Israel Ministry of Construction and Housing. Climate and energy consultant for the new masterplan of Netivot (with Meir, I. and Etzion Y.).

1994 The Negev Tourism Development Administration. The Negev in the Peace Era - Building in the Desert. (with Etzion, Y. and Meir, I.)

1992 M.Oron Architects. Special School in Beer-Sheva - Climatic Assessment Report. (With Meir, I. and Pearlmutter, D.)

<u>Reviewer for funding agencies</u>

European Commission - DG Research & Innovation; Israel Science Foundation; German-Israeli Foundation for Scientific Research and Development (GIF); Israel Ministry for National Infrastructures; Israel Ministry for Science, Culture and Sport; Research Grants Council, Hong Kong; BEI-COFUND – University of Liege, Belgium; University of Sharjah; The Hymen T. Milgrom Trust, Haifa University.

***(d) Editor or member of editorial board of scientific or professional journals***

Member of Editorial board, *The Journal of Advances on Building Energy Research*. (2006-2017)

Member of Editorial Board, *Sustainability*. (2020-)

***(e) Ad-hoc reviewer for scientific journals:***

Advances in Building Energy Research; Applied Energy; Applied Thermal Engineering; Architectural Science Review; Building and Environment; Building Simulation; Clean Air: International Journal on Energy for a Clean Environment; Climate Research; Energy and Buildings; Energy Conversion and Management; Environmental Engineering and Management Journal; Environmental Research Letters; Frontiers in Earth Science (Atmospheric Science); Geoscientific Model Development Discussions; International Journal of Biometeorology; International Journal of Climatology; International Journal of Solar Energy; Journal of Applied Meteorology and Climatology; Journal of Arid Environments; Journal of Atmospheric and Oceanic Technology; Landscape and Urban Planning; Solar Energy; Solar Energy Materials and Solar Cells; Sustainable Cities and Society; Theoretical and Applied Climatology; Urban Climate; Urban Design; Urban Ecosystems; PLOS One.

***(f) Membership in professional/scientific societies***

1989- Registered architect, Israel.

1999- Member, International Solar Energy Society (ISES)

1999- Member, International Association of Urban Climatology (IAUC)

2014- Associate, Passive and Low Energy Architecture (PLEA)

## EDUCATIONAL ACTIVITIES

***(a) Courses taught***

2012- "Microclimate and urban planning", undergraduate, Ben Gurion University – Dept. of Geography and Environmental Development.

2008 - "Introduction to Green Building in the Desert", undergraduate, Ben Gurion University – Dept. of Geography and Environmental Development.

2001-2018 "The Human Dimension – Living in Drylands", graduate, Ben-Gurion University - Katz School for Desert Studies.

2001-2018 "The urban micro-climate: planning and architectural design issues", graduate, Ben-Gurion University – Katz School for Desert Studies.

2001-2018 "Passive heating and cooling of buildings", graduate, Ben-Gurion University – Katz School for Desert Studies.

2000 "Design studio on low-energy housing", undergraduate, Adelaide University – Dept. of Architecture, Landscape Architecture and Urban Planning (with White, D.)

1998-1999 "Climatic design", undergraduate, The Hadassa Canadian-Wizo Neri Bloomfield College of Design: (jointly with Y. Etzion, I. Meir and D. Pearlmutter)

1992 "A Comprehensive Approach to Desert Architecture". Workshop of the Faculty of Architecture and Town Planning, Technion-Israel Institute of Technology held at the Sede Boqer Campus, July 13-14. (with Meir, I. and Pearlmutter, D.).

1989-90 "Introduction to Climatic Design", undergraduate, Environmental Design Dept., Bezalel-Academy of Fine Arts, Jerusalem (with Etzion, Y., Meir, I. and Pearlmutter, D.).

***(b) Research students***

**Post-Doc**

| | | |
|---|---|---|
| Shashua-Bar, L. | 2007-8 | Blaustein Inst. for Desert Research, BGU<br>Supervisors: Erell E., Pearlmutter D. |
| Kaplan, S | 2015-17 | Blaustein Inst. for Desert Research, BGU<br>Supervisor Erell E. |
| Zou, B. | 2018- | Blaustein Inst. for Desert Research, BGU<br>Supervisors: Erell E., Kloog I. |

**PhD**

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|---|---|---|
| Kaftan, E. | 2013 | Blaustein Inst. for Desert Research, BGU<br>Supervisor: Erell E. |
| Friedman, C. | 2014 | Blaustein Inst. for Desert Research, BGU<br>Supervisors: Erell E., Becker N. |
| Goulden, S | 2016 | Blaustein Inst. for Desert Research, BGU<br>Supervisors: Erell E., Pearlmutter D., Garb Y. |
| Rosenfeld S. | | Blaustein Inst. for Desert Research, BGU<br>Supervisor: Erell E. |
| Bogin, D. | | Geography & Environmental Development, BGU<br>Supervisors: Kissinger M., Erell E. |
| Katungyi, J. | | Carnegie-Mellon Univ.<br>Supervisors: Loftness V., Cochran E., Germain A., Erell E. |

**MA/MSc**

| | | |
|---|---|---|
| Dolev, A. | 2005 | Blaustein Inst. for Desert Research, BGU<br>Supervisors: Erell E., Biryukov S. |
| Essa, S. | 2009 | Blaustein Inst. for Desert Research, BGU<br>Supervisors: Erell E., Garb Y. |
| Schweitzer, O. | 2010 | Porter School for Environmental Studies, TAU,<br>Supervisors: Erell E., Waisel Y. |
| Boneh, D. | 2014 | Geography & Environmental Development, BGU<br>Supervisors: Erell E., Bar-Kutiel P. |
| Kalman, Y. | 2014 | Blaustein Inst. for Desert Research, BGU<br>Supervisors: Erell E., Pearlmutter D. |
| Snir, K. | 2014 | Blaustein Inst. for Desert Research, BGU<br>Supervisors: Erell E., Pearlmutter D. |
| Leaf, J. | 2016 | Blaustein Inst. for Desert Research, BGU<br>Supervisor: Erell E. |
| Assif, M. | 2016 | Blaustein Inst. for Desert Research, BGU<br>Supervisors: Erell E., Portnov B. |

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|---|---|---|
| Katungyi, J. | 2016 | Carnegie-Mellon Univ.<br>Supervisors: Loftness V., Cupkova D., Cochran E., Erell E. |
| Bogin, D. | 2019 | Geography & Environmental Development, BGU<br>Supervisors: Kissinger M., Erell E. |
| Blank, T. | 2020 | Geography & Environmental Development, BGU<br>Supervisor: Erell E. |
| Yashevitz, Y. | 2020 | Geography & Environmental Development, BGU<br>Supervisor: Kloog I., Erell E. |
| Alexandroff V. | 2020 | Geography & Environmental Development, BGU<br>Supervisors: Erell E., Kloog I. |
| Rosengarten T. | | Geography & Environmental Development, BGU<br>Supervisor: Erell E. |
| Gilad R. | | Geography & Environmental Development, BGU<br>Supervisor: Erell E. |

## AWARDS, CITATIONS, HONORS, FELLOWSHIPS

### *(a) Honors, Citation Awards*

1988 The David & Paula Ben Gurion Fund - The Haim Shiba Prize, (jointly with Meir I.and Pearlmutter D.).

2000 PLEA 2000 Conference - Best Paper Award (jointly with Etzion Y. and Portnov B.), for the paper: "A GIS framework for studying post-occupancy climate-related changes in residential neighborhoods".

2011 The Emilio Ambasz Award for Green Architecture (awarded by Architecture in Israel) – Project of the Year, Research category, 2nd place. For the "Design Manual for Bio-Climatic Construction in Israel" (jointly with D. Pearlmutter, I. Meir, Y. Etzion and Y. Rofe).

2012 The Emilio Ambasz Award for Green Architecture (awarded by Architecture in Israel) – Project of the Year, Research category. For the study on "Daylighting and Visual Comfort in Offices" (jointly with Eran Kaftan).

2020 PLEA 2020 conference – Best Paper Award for the paper "The Effect of Increasing Vegetation Cover on Energy Demand for Heating and Cooling Buildings in a Dense Mediterranean City".

## SCIENTIFIC PUBLICATIONS

(as of September 2020)

H-index, (ISI: 18. GS: 30)
Total number of citations of all articles (ISI: 1280. GS: 3611)
Total number of citations without self-citations (ISI: 1227. GS: )

***(a) Authored books***

1. Portnov B. and **Erell E.** 2001. Urban Clustering: The Benefits and Drawbacks of Location, Ashgate, Aldershot, 317p. ISBN-10 0754614492
2. Portnov, B. and **Erell, E**. 2003. Interregional Inequalities in Israel: 1948-1995 Census Data, Israel Central Bureau of Statistics, Jerusalem, 165p. ISBN9659042310
3. Portnov, B. and **Erell, E.** 2003. Interregional Inequalities in Israel: 1948-1995 Census Data, Israel Central Bureau of Statistics, Jerusalem, 131p. (Hebrew edition) ISBN9659042337
4. Yannas, S., **Erell, E.** and Molina, J.L. 2006. Roof Cooling Techniques – A Design Handbook, James & James Science Publishers, London, 332p. ISBN 9781844073139
5. **Erell E.**, Pearlmutter D. and Williamson T. 2011. Urban Microclimate: Designing the Spaces between Buildings. Earthscan/James & James Science Publishers, London, 266p. ISBN-10: 1844074676

***(b) Editorship of collective volumes***

1. Etzion Y., **Erell E.** Meir I.A. and Pearlmutter D. 1996. Architecture of the Extremes - Proceedings of the 11th PLEA International Conference. Special issue of *Energy and Buildings,* Volume 23, pp. 161-311.
2. Mills G., DiSabatino S., **Erell E**. and Martilli A. 2014. Proceedings of the 8th International Conference on Urban Climate and the 10th Symposium on the Urban Environment. Special Issue of *Urban Climate,* Volume 10 (2), pp. 201-476.

***(c) Refereed chapters in collective volumes - Conference proceedings, Festschrifte, etc.***

1. Etzion Y., **Erell E.**, Meir I., Pearlmutter D., Belaish M. 1989. The Blaustein Center for Desert Studies, in Kimura, K. (ed.) Global Environment and Architecture in the industrialized Age, Proceedings, 7th PLEA International Conference, Nara, Japan, pp. 169-171.
2. Etzion Y. and **Erell E**. 1989. A hybrid radiative-convective cooling system for-hot arid zones, in Horigome T., Takakkura T., Fujii I., Kimura K. and Nishino T. (Eds) Clean and Safe Energy Forever, Proceedings, 1989 ISES Solar World Congress, Kobe, Japan, pp. 477-481.
3. **Erell E.** and Etzion Y. 1990. A combined hybrid radiative cooling and heating systems for arid zones, in Sayigh, A. A. M., (ed.) Energy and the Environment into the 1990's, Proceedings of the 1st World Renewable Energy Congress, Reading, United Kingdom, Sept. 1990, pp. 2723-2727.
4. Etzion Y. and **Erell E.** 1990. The location of thermal storage mass as a parameter in radiative cooling systems, in Sayigh, A. A. M., (ed.) Energy and the Environment into the 1990's, Proceedings of the 1st World Renewable Energy Congress, Reading, United Kingdom, Sept. 1990, pp. 2356-2360.
5. **Erell E.** and Etzion Y. 1991. The effect of convection on a roof pond cooled by radiation in a hot-arid climate, in Alvarez S., Lopez De Asiain J., Yannas S. & De Oliviera Fernandes E. (eds.) Architecture and Urban Space, Proceedings of the 9th PLEA International Conference, Seville, Spain, Sept. 1991, pp. 613-618.

6. **Erell E.**, Etzion Y., Brunold S., Rommel M., Wittwer V. 1992. A passive cooling laboratory building for hot-arid zones, Proceedings of the 3rd International Conference - Energy and Building in Mediterranean Area, Thessaloniki, Greece, April 8-10, 1992, pp. 117-124.
7. **Erell E.** 1993. Leading by Design: The role of academic institutions in promoting climate-conscious architecture, Proceedings of the EC-Israel Business Seminar, Jerusalem, Israel, May 9-12, 1993, pp. 99-103.
8. Pearlmutter D., Di H., Etzion Y., **Erell E.** and Meir I. 1994. The Development of an Evaporative Cooling Tower for Semi-Enclosed Spaces, in Etzion Y., **Erell E.**, Meir I. and Pearlmutter D. (eds.), Architecture of the Extremes, proceedings of the 11th PLEA International Conference, Dead Sea, Israel, July 3-8, 1994, pp. 205-212.
9. **Erell E.**, Pearlmutter D., Di H., Etzion Y. and Meir I. 1995. The Development of an Evaporative Cool Tower for Semi-Enclosed Spaces, in Santamouris, M. and Asimakopoulous D. (eds.) Proceedings of the International Symposium on Passive Cooling of Buildings, Athens, Greece, June 19-20, 1995, pp. 271-279.
10. **Erell E.** and Tsoar H. 1996. The effect of a city on aeolian dust deposits: a case study in Be'er Sheva, Israel, ICUC'96 International Conference on Urban Climatology, Essen, Germany, June 10-14, 1996.
11. Etzion Y. and **Erell E.** 1996. Employing a radiative cooling system for solar heating in winter, in De Herde, A. (Ed.) Building and Urban Renewal, Proceedings of the 13th PLEA International Conference, Louvain-la-Neuve, Belgium, July 16-18, 1996, pp. 105-110.
12. **Erell E.** 1998. A critical examination of strategies for protection from airborne dust in the urban environment, in Maldonado E. and Yannas S. (Eds.) Environmentally Friendly Cities, proceedings of the 15th PLEA International Conference, Lisbon, Portugal, June 1-5, 1998, pp. 491-494.
13. **Erell E.** and Etzion Y. 1998. Analysis and experimental verification of an improved cooling radiator, in Sayigh, A.A. (Ed.) Energy Efficiency, Policy and the Environment, Proceedings of World Renewable Energy Congress V, Florence, Italy, September 20-25, 1998, pp. 700-703.
14. **Erell E.** and Etzion Y. 1999. A novel ventilated reversible glazing system, Proceedings of the 1999 ISES Solar World Congress, Jerusalem, July 4-9, 1999, pp. 205-212.
15. **Erell E.** and Etzion Y. 1999. Controlling the transmission of radiant energy through windows: a novel, ventilated, reversible glazing system, Proceedings of the Workshop on Energy-Efficient Buildings, Ma'ale Hachamisha, Israel, March 14-15, 1999, pp. 38-41.
16. **Erell E.** and Etzion Y. 1999. A novel glazing system for climates with hot and cold extremes, in Szokolay, S. (Ed.) Sustaining the Future: Energy – Ecology – Architecture, Proceedings of the PLEA '99 Conference, Brisbane, September 22-24, 1999, pp. 107-112.
17. Etzion Y., Pearlmutter D. **Erell E.** and Meir I. 1999. Adaptive architecture: Integrating low-energy technologies for climate control in the desert. In: Portnov B, Hare A. (eds.) Desert Regions: Population, Migration, and Environment. Springer Verlag, Berlin etc., 332p.
18. **Erell E.** and Tsoar H. 1999. An experimental evaluation of strategies for reducing airborne dust in desert cities. In: Portnov B, Hare A. (Eds.) Desert Regions: Population, Migration, and Environment. Springer Verlag, Berlin etc., 332p.

19. Portnov B.A. and **Erell E.** 1999. Long-term development patterns of peripheral desert settlements. In: Portnov B, Hare A. (Eds.) Desert Regions: Population, Migration, and Environment. Springer Verlag, Berlin etc., 332p.
20. Portnov B.A. and **Erell E.** 1999. The effect of remoteness and isolation on the development of peripheral settlements. In: Portnov B, Hare A. (eds.) Desert Regions: Population, Migration, and Environment. Springer Verlag, Berlin etc., 332p.
21. Etzion Y., Portnov B., **Erell E.**, Meir I. and Pearlmutter D. 2000. Climate-related changes in residential neighbourhoods: analysis in a GIS framework, in Steemers K. and Yannas S. (Eds.) Architecture – City – Environment, Proceedings of the PLEA 2000 Conference, Cambridge, UK, July 4-6, 2000, pp. 781-782.
22. Etzion Y., Portnov B., **Erell E.** 2000. A GIS framework for studying post-occupancy climate-related changes in residential neighborhoods, in Steemers K. and Yannas S. (Eds.) Architecture – City – Environment, Proceedings of the PLEA 2000 Conference, Cambridge, UK, July 4-6, 2000, pp. 678-683. ***Best Paper Award*.**
23. Williamson, T.J. **and Erell, E.** 2001. Thermal performance simulations and the urban micro-climate: measurement and prediction, In Building Simulation 2001, Proceedings of the 7th International IBPSA Conference, Rio de Janeiro, Brazil, August 13-15, 2001, pp. 159-165.
24. Molina J.L., Maestre I.R., Sandberg M., Maldonado E., Leal V., **Erell E.**, Etzion Y. and Gutschker O. 2002. Modeling the effect of ventilated air cavities in the SOLVENT prototype: A reversible solar-screen glazing system. Preliminary results. In Energy Efficient & Healthy Buildings in Sustainable Cities, Proceedings of the 3rd European Conference on Energy Performance & Indoor Climate in Buildings and The 23rd Conference of the Air Infiltration & Ventilation Centre, Lyon, France, October 23-26, 2002, pp. 425-430.
25. **Erell E.**, Etzion Y., Carlstrom N., Sandberg M., Molina J.L., Maestre I.R., Maldonado E., Leal V. and Gutschker O. 2002. SOLVENT: Development of a reversible solar-screen glazing system. In Energy Efficient & Healthy Buildings in Sustainable Cities, Proceedings of the 3rd European Conference on Energy Performance & Indoor Climate in Buildings and The 23rd Conference of the Air Infiltration & Ventilation Centre, Lyon, France, October 23-26, 2002, pp. 485-490.
26. **Erell E.** and Williamson T.J. 2002. Predicting air temperatures in the urban canopy layer from measured reference data, in GRECO and ACAD (Eds.) Design with the Environment, Proceedings of the 19th PLEA International Conference, Toulouse, France, July 22-24, 2002, pp. 145-152.
27. Erell, E. 2002. Energy conscious architecture in the Negev in modern times, In: Porat, H. and Gradus, Y. (Eds.) The Negev: 50 Years of Progress – Vardimon Memorial Volume. Joe Alon Center, Kibbutz Lahav & Ariel Publishing House, Jerusalem, pp. 141-150. (In Hebrew)
28. **Erell E.**, Leal V. and Maldonado, E. 2003. On the measurement of air temperature in the presence of strong solar radiation. In: Klysik, K., Oke, T.R., Fortuniak, K. Grimmond C.S.B. and Wibig, J. (Eds.) Proceedings of the Fifth International Conference on Urban Climate, Lodz, Poland, September 1-5, 2003, pp. 381-384.

29. Leal V., Maldonado E., **Erell E.** and Etzion Y. 2003. Modelling a reversible ventilated window for simulation within ESP-r: The SOLVENT case. In Building Simulation 2003, Proceedings of the 8th International IBPSA Conference, Eindhoven, Nethelands, August 11-14, 2003, pp. 713-720.

30. **Erell E.** and Williamson T. 2004. The CAT model: Predicting air temperature in city streets on the basis of measured reference data, In: Bromberek, Z. (Ed.) Contexts of Architecture, Proceedings of the 38th Annual Conference of the Architectural Science Association ANZAScA and the International Building Performance Association, Australasia, Launceston, Australia, November 10-12, 2004, pp. 210-215.

31. Leal V., Sandberg, M. Maldonado E. and **Erell E.** 2004. An analytical model for the airflow in a ventilated window with known surface temperatures, In da Silva, M. (Ed.) Proceedings of ROOMVENT 2004 - 9th International Conference on Air Distribution in Rooms, Coimbra, Portugal, September 5-8, 2004. Paper 123.

32. **Erell E.**, Etzion Y., Pearlmutter D., Guetta R., Pecornik D., Zimmermann H. and Krutzler F. 2005. A novel multi-stage down-draft evaporative cool tower for space cooling. Part 1: Aerodyanamic design. In Santamouris, M. (Ed.) Passive and Low Energy Cooling for the Environment. Proceedings of PALENC 2005, 1st International Conference on Passive and Low Energy Cooling for the Built Environment, Santorini, Greece, May 19-21, 2005, pp. 521-528.

33. **Erell E.**, Etzion Y., Pearlmutter D., Guetta R., Pecornik D., Zimmermann H. and Krutzler F. 2005. A novel multi-stage down-draft evaporative cool tower for space cooling. Part 2: Preliminary experiments with a water spraying system. In Santamouris, M. (Ed.) Passive and Low Energy Cooling for the Environment, Proceedings of PALENC 2005, 1st International Conference on Passive and Low Energy Cooling for the Built Environment, Santorini, Greece, May 19-21, 2005, pp. 529-536.

34. **Erell E.** and Williamson T. 2006. The estimation of air temperature in an urban street canyon on the basis of measured data from a meteorological station in the region. In Grimmond S. and Lindqvist S. (Eds.) Proceedings of ICUC6 – 6th International Conference on Urban Climate, Goteborg, Sweden, June 12-16 2006, pp.404-407.

35. **Erell E.**, Pearlmutter D. and Etzion Y. 2006. A multi-stage down-draft evaporative cool tower for semi-enclosed spaces. Part 1: Aerodyanamic design. In Compagnon, R., Haefeli, P. and Weber, W. (Eds.) Clever Design, Affordable Comfort - Proceedings of PLEA 2006, 23rd International Conference on Passive and Low Energy Architecture, Geneva, Switzerland, September 6-8, 2006, pp. II 559-564.

36. Pearlmutter D., Etzion Y. and **Erell E.** 2006. A multi-stage down-draft evaporative cool tower for semi-enclosed spaces. Part 2: Water spraying system. In Compagnon, R., Haefeli, P. and Weber, W. (Eds.) Clever Design, Affordable Comfort - Proceedings of PLEA 2006, 23rd International Conference on Passive and Low Energy Architecture, Geneva, Switzerland, September 6-8, 2006, pp. II 565-570.

37. **Erell E.**, Yannas S. and Molina J.L. 2006. Roof cooling techniques. In Compagnon, R., Haefeli, P. and Weber, W. (Eds.) Clever Design, Affordable Comfort - Proceedings of PLEA 2006, 23rd International Conference on Passive and Low Energy Architecture, Geneva, Switzerland, September 6-8, 2006, pp. II 571-575.

38. **Erell E.** 2007. Evaporative cooling. Book chapter in Santamouris, M. (Ed.) Advances in Passive Cooling, James & James Science Publishers, London. 303p.

39. **Erell E.** 2007. Radiative cooling. Book chapter in Santamouris, M. (Ed.) Advances in Passive Cooling, James & James Science Publishers, London. 303p.

40. **Erell E.** and Williamson T. 2007. The spatial variability of air temperature in the urban canopy layer. In Santamouris M. and Wouters P. (Eds.) Building Low Energy Cooling and Advanced Ventilation Technologies in the 21st Century. Proceedings of the 2nd PALENC Conference and 28th AIVC Conference, September 27-29 2007, Crete, Greece, pp. 304-308.

41. **Erell E.**, Soebarto V. and Williamson T. 2007. Accounting for urban microclimate in computer simulation of building energy performance. In Wittkopf S. and Tan B. K. (Eds.) Sun, Wind and Architecture, Proceedings of PLEA 2007, 24th International Conference on Passive and Low Energy Architecture, Singapore, November 22-24, 2007, pp. 593-600.

42. Shashua-Bar L., **Erell E.** and Pearlmutter D. 2008. The cooling effect and water use efficiency of urban landscape strategies in a hot dry climate. In Kenny P., Lewis O. And Brophy V. (Eds.) Towards Zero Energy Buildings, Proceedings of PLEA 2008, 25th International Conference on Passive and Low Energy Architecture, Dublin, October 22-24, 2008, paper 457.

43. Grimmond C.S.B, Best M., Barlow J., Baik J.J., Belcher S., Bruse M,. Calmet I., Chen F., Clark P, Dandou A, **Erell E.**, Fortuniak K., 10 Hamdi R., Kanda M., Kawai T., Kondo H., Krayenhoff S., Lee S.H., Shashua-Bar, L., Martilli A., Masson V., Miao S., Mills G., Moriwaki R., Oleson K., Porson A., Sievers U., Tombrou M., Voogt J., Williamson T. 2009. Urban surface energy balance models: model characteristics and methodology for a comparison study. Chapter in: Baklanov A., Grimmond S., Mahura A. and Athanassiadou M. (eds.) Meteorological and Air quality Models for Urban Areas. Springer, Dordrecht – Heidelberg – London – New York. 183 p.

44. Shashua-Bar L., **Erell E.** and Pearlmutter D. 2009. Water use considerations and cooling effects of urban landscape strategies in a hot dry region. ICUC7 - The 7th International Conference on Urban Climate, Yokohama, Japan, July 3-6 2009. http://www.ide.titech.ac.jp/~icuc7/extended_abstracts/index-web.html, P1-43.

45. Shashua-Bar L., **Erell E.** and Pearlmutter D. 2009. Microscale vegetation effects on outdoor thermal comfort in a hot-arid environment. ICUC7 - The 7th International Conference on Urban Climate, Yokohama, Japan, July 3-6 2009. http://www.ide.titech.ac.jp/~icuc7/extended_abstracts/index-web.html, B14-7.

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***(d) Refereed articles and refereed letters in scientific journals***

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53. Zhou B., Kaplan S., Peeters A., Kloog I. and **Erell E**. 2020. 'Surface', 'Satellite' or 'Simulation': mapping intra-urban microclimate variability in a desert city. *International Journal of Climatology*, 40 (6):3099-3117.

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56. Zhou B., **Erell E.**, Hough I., Shtein A., Just A., Novack V., Rosenblatt J. and Kloog I. 2020. Estimation of hourly near surface air temperature across Israel using an ensemble model. *Remote sensing*, 12, 1741; doi:10.3390/rs12111741.

57. Zuazua-Ros A., Ramos J., Martin-Gomez C., Gomez-Acebo T. and **Erell E.** 2020. Performance and feasibility assessment of a hybrid cooling system for office buildings based on heat dissipation panels. *Energy*, accepted.

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### *(e) Published scientific reports and technical papers*

1. Etzion Y., **Erell E.**, Pearlmutter D. 1991. Monitoring the Performance of an Earth Sheltered Structure in the Negev Highland, report to the Israeli Ministry of Energy and Infrastructure, Research and Development Division (in Hebrew).

2. Tsoar H., **Erell E.** 1992. The Effect of Buildings on the Deposition of Dust in a Desert City, report to the Ministry of Energy and Infrastructure, Earth Sciences Administration (in Hebrew).

3. Etzion Y., **Erell E.** 1993. Radiative Cooling of Buildings, Final Research Report, National Research and Development Agency, Israel.
4. Etzion Y., Meir I. and **Erell E.** 1994. The Negev in Peace - Building in the Desert, Masterplan for the Development of the Negev, First Stage Report submitted to the Negev Tourism Development Administration (in Hebrew).
5. **Erell, E**. 1995. The Effect of Buildings on the Deposition of Dust in a Desert City, M.A. thesis, Ben-Gurion University of the Negev, Be'er Sheva.
6. Portnov B. A., **Erell E.** and Pearlmutter D. 1997. Development Peculiarities of Urban Settlements in the Negev: Cross-Regional Analysis, Negev Center for Regional Development - Working Paper No. 9, Ben-Gurion University of the Negev, Be'er Sheva, 31pp.
7. Etzion Y., Portnov B., **Erell E.**, Meir I. and Pearlmutter P. 2000. A Computerized System for Tracking Modifications to Housing in Ministry of Housing Neighborhoods, final research report to the Israel Ministry for Housing. (in Hebrew)
8. Etzion Y., **Erell E.** and Portnov B. 2000. Mapping the Potential for "Green Construction" in Israel, final research report to the Israel Ministry for the Environment. (in Hebrew)
9. **Erell E.** and Etzion Y. 2002. SOLVENT – Development of a Ventilated, Solar-screen Glazing System, final research report to the European Commission, ENERGIE Program.
10. Portnov B. and **Erell E.** 2002. Interregional Inequalities in Israel 1948-1995: Divergence or Convergence? Final research report to the Israel Foundation Trustees.
11. Yannas S., **Erell E.** and Molina, J. 2003. Roof Cooling Techniques – A Design Handbook, final report to the European Commission, ALTENER Program.
12. **Erell E.** 2005. Predicting Air Temperature in City Streets on the Basis of Measured Reference Data, Ph.D. thesis, The University of Adelaide, Adelaide.
13. **Erell E.**, Etzion E. Pearlmutter D. and Mutzafi-Haller W. 2006. Multi-stage Down-Draft Evaporative Cool Tower for Large Closed and Semi-enclosed Spaces. Final research report submitted to the BMBF (Germany) and Ministry of Science and Technology, Israel.
14. **Erell E.**, Kaftan E. and Motzafi-Haller W. 2011. Daylighting for visual comfort and energy conservation in offices in sunny locations. Final research report to the Israel Ministry of National Infrastructures. (Partly in Hebrew)
15. **Erell E.**, Friedman C. and Becker N. 2013. Energy retrofit of residential buildings in Israel. Final research report to the Israel Ministry of Energy and Water. Publication number RD-05-13 (in Hebrew).
16. Garb Y., Becker N., Pearlmutter D., Goulden S. and **Erell E.** 2015. Survey of green building incentives and their adaptation to Israel. Final Research report to the Israel Ministry for Environmental Protection. 84p.
17. **Erell E.**, Assif M. and Portnov B. 2016. Promoting energy saving behaviour in residential buildings in Israel. Final research report to the Israel Ministry of Infrastucture, Energy and Water. Publication number RD-19-16 (in Hebrew).

18. **Erell E.**, Kloog I., Dorman M., Vulkan A. and Alexandroff V. 2019. The Potential for PV Installation in Residential Buildings in Dense Urban Areas. Final research report to the Israel Ministry of Infrastructure, Energy and Water. Publication number RD-26–19 (in Hebrew).

***(f) Non-refereed professional articles and publications***

1. Etzion Y., **Erell E.**, Meir I., Pearlmutter D. and Belaish M. 1993. The International Center for Desert Studies Building at the Desert Research Institute, The Building Centre of Israel Bulletin, 32:17-22 (in Hebrew).
2. **Erell E.** 1999. Energy conservation in buildings in Israel, *Mivnim*, 198:34-48. (in Hebrew).
3. **Erell E.** 1999. A reversible glazing system. *Mivnim*, 198:49-55. (in Hebrew).
4. **Erell E.** 2008. Green Building in Blue and White, *Perspectiva* – Journal of the United Architects Association in Israel, 27:44-48. (in Hebrew)
5. **Erell E.** 2008. Exploring Low Energy Building – A review of the book 'A Handbook on Low-Energy Building and District Heating Systems', by D. Harvey. *Reforesting Scotland* 37:39.
6. Pearlmutter D., **Erell E**., Etzion Y., Meir I. and Rofe Y. 2010. Design Manual for Bio-Climatic Construction in Israel. Israel Ministry for National Infrastructures, 154p. Electronic online publication (in Hebrew). http://www.bgu.ac.il/CDAUP/guidebook.pdf
7. **Erell E.** and Kaftan E. 2011. Daylighting for visual comfort and energy conservation in offices in sunny locations: Design Guidelines. Israel Ministry of National Infrastructures, 56p. Electronic online publication (in Hebrew). http://www.bgu.ac.il/CDAUP/daylighting-guidelines-hebrew.pdf
8. **Erell E.** 2015. Energy Conservation in Residential Buildings in Israel. Ben-Gurion University and the Israel Ministry of National Infrastructure, Energy and Water, 387p. (in Hebrew). http://energy.gov.il/subjects/energyconservation/ecexpert/documents/energy%20conservation%20in%20buildings_ev06s.pdf
9. **Erell E.** 2015. The importance of updating standard SI 1045 – thermal insulation of buildings. *Mivnim* 315:46-48 (Part 1); *Mivnim* 316:50-52 (Part 2). (in Hebrew)
10. **Erell E.** 2016. Should we be concerned about urban heat islands? *Ecology and Environment*, 7(3):244-250.

## LECTURES AND PRESENTATIONS AT MEETINGS AND INVITED SEMINARS

***(a) Invited plenary lectures at conferences/meetings***

International:

1. **Erell E.** 2011. Implementing Urban Climatology in the 'Real World' - Theory and Practice. Croucher Advanced Study Institute 2011-2012: Urban Climatology in Trocal and Sub-Trocal Regions. The Chinese University of Hong Kong, Hong Kong, December 5-10 2011. http://web5.arch.cuhk.edu.hk/asi2011/en/Sources/ASI%203%20Abstract.pdf

2. **Erell E.** 2013. Microclimate in Urban Planning. Conference on Energy Efficiency Strategies for Buildings. Tallinn University of Technology, October 9-11 2013. **Keynote.** https://ttu.ee/projects/enef/conference-and-exhibition/abstracts-of-presentations-2/
3. **Erell E.** 2013. Retrofitting to nZEB. Conference on Energy Efficiency Strategies for Buildings. Tallinn University of Technology, October 9-11 2013. **Keynote.** https://ttu.ee/projects/enef/conference-and-exhibition/abstracts-of-presentations-2/
4. **Erell E.** 2015. Urban microclimate and equity in planning and design. Radcliffe Institute for Advanced Study, Harvard University: Seminar on Climate Justice - Understanding Disparities in Climate-Health Outcomes and Fostering Equity in Planning and Design, Cambridge, MA, January 20-21 2015.
5. **Erell E.** 2016. Renewable Energy and Urban Form. Smart and Sustainable Cities Conference, UCLA Institute of the Environment and Sustainability, Los Angeles, May 19 2016. **Keynote.** https://www.international.ucla.edu/israel/article/165352
6. **Erell E.** 2019. When Shading is Not the (whole) Answer: A fresh look at radiant exchange. The joint XV ENCAC / XI ELACAC Conference on Comfort in the Built Environment. João Pessoa, Brazil, September 18-21 2019. **Keynote.** https://www.even3.com.br/encac2019/
7. **Erell E.** 2019. Integrated modelling of blue-green urban infrastructure in a Mediterranean city. Heat and Habitat in Cities Symposium, Adelaide University, December 9-10 2019. https://ecms.adelaide.edu.au/architecture/h2csymposium#speakers

In Israel:

1. **Erell E.** 2007. Shading solutions for high-rise residential buildings. Seminar on Green buildings: Application of climatic design guidelines in high-rise residential construction in the Dan region, Tel Aviv, September 4 2007.
2. **Erell E.** 2008. Israel Standard 5282 and the design of energy conserving buildings in the Negev. Seminar on Green Building and Sustainable Development: Principles, technologies and Standards, Midreshet Ben Gurion, March 4 2008.
3. **Erell E.** 2008. How can local authorities in Israel promote green building?. Seminar on Environmental Protection by Local Authorities, Israel State Comptroller and Ombudsman, Tel Aviv, July 23 2008.
4. **Erell E.** 2010. Computer simulation of building energy performance: Is standard weather data sufficient? World Meteorological Day Seminar, Israel Meteorological Service, Tel Aviv, March 23, 2010.
5. **Erell E.** 2013. Seeing the light – visual comfort and energy conservation in buildings. Seminar on Sustainable Building in the Southern Region, Israel Ministry of Environmental Protection and Ministry of Interior, Beer Sheva, February 27 2013.
6. **Erell E.** and Kaftan E. 2013. Visual comfort and energy conservation in daylit office buildings. Annual meeting of the Israel Society for Lighting Engineers. Tel Aviv, March 6 2013.
7. **Erell E.**, Kloog I., Dorman M. and Vulkan A. 2018. Solar potential of urban buildings. Israel Ministry of National Infrastructure, Energy and Water Resources – Chief Scientist's Seminar. Jerusalem, June 6 2018.

8. **Erell E.** and Aviva P. 2018. Urban Design Strategies for Water Sensitive Cities. Stormwater Management and Recovery – The Australian Model. Tel Aviv, July 10 2018.
9. **Erell E.** 2018. Zero Energy Buildings in Dense Urban Neighborhoods: Estimating the Potential for BIPV. Round table at The Jerusalem Institute for Policy Research, Jerusalem, July18 2018.

***(b) Presentation of papers at conferences/meetings***

1. **Erell E.** and Tsoar H. 1992. Dust in Beer-Sheva - man made or a curse of nature? Annual Conference of the Israel Geographical Association, Beer-Sheva, Dec. 21-22, 1992.
2. **Erell E.** and Tsoar H. 1992. The Effect of buildings on the deposition of dust in a desert city. The Geomorphological Meeting, Dept. of Geography, Ben-Gurion University of the Negev, Beer Sheva, January 1992.
3. Pearlmutter D., **Erell E**. and Etzion Y. 1992. Monitoring an insulated earth-bermed structure in a desert climate, Proceedings of the 5th International Conference on Underground Space and Earth Sheltered Structures, Delft, Netherlands, Aug. 1992.
4. Etzion Y., **Erell E.**, Pearlmutter D., Tene M. 1993. Effects of soil temperature and insulation on the behavior of an earth-sheltered desert structure, in Solar Energy in Architecture and Urban Planning, proceedings of the 3rd European Conference on Architecture, Florence, Italy, May 17-21, 1993.
5. Tsoar H. and **Erell E.** 1995. The Effect of a desert city on aeolian dust deposition. Desert Technology III Conference, Yamanashi, Japan, Oct. 15-20, 1995.
6. Portnov. B. A. and **Erell E.** 1998. Sustainability of Urban Growth in Peripheral Areas: The Case of Israel. Urban Development: A Challenge for Frontier Regions, 2nd International Conference, Be'er Sheva, Israel, April 5-7, 1998.
7. Etzion Y., **Erell E.**, Pearlmutter D., Guetta R., Pecornik D., Zimmermann H. and Krutzler F. 2005. A novel multi-stage down-draft evaporative cool tower for space cooling. Annual meeting of the Israel Chapter of ISES, Tel Aviv, Israel, May 19 2005.
8. Dolev A., Biryukov S. and **Erell E.** 2005. Dust deposition in a courtyard as an indicator of the effect of buildings on coarse aeolian particles. 19th Annual Meeting of the Israeli Association for Aerosol Research. Tel Aviv, December 29, 2005.
9. **Erell E.** and Williamson T. 2006. A computer model for predicting air temperature in urban street canyons from measured data at a standard weather station. Annual meeting of ASHRAE, Quebec City, Canada, June 24-28 2006.
10. **Erell E.** 2007. Israel Standard 5282 – Energy rating of buildings. 1st International Conference on Sustainable Energy as a Catalyst for Regional Development, Eilat, Israel, June 5-7 2007.
11. **Erell E.** 2007. Climate-conscious architecture in the desert. 1st International Conference on Sustainable Energy as a Catalyst for Regional Development, Eilat, Israel, June 5-7 2007.
12. **Erell E.** 2008. Microclimatic issues in the planning of a modern city in a desert environment. Annual meeting of the American Association for the Advancement of Science, Boston, MA, February 14-18 2008.

13. **Erell E.** 2008. Effects of Density and Vegetation on the Microclimate of a Modern City in a Desert Environment. The second conference on Deserts, Drylands and Desertification, Sde Boqer, Israel, December 14-17 2008.
14. **Erell E.** 2009. Green Building in blue and white: a critical look at policies for environmentally friendly construction in Israel. Eilat-Eilot International Renewable Energy Conference & Exhibition, Eilat, Israel, February 17-19 2009.
15. Cleugh H., Emmanuel R., Endlicher W., **Erell E.**, McGranahan G., Mills G., Ng E., Nickson A., Rosenthal J. and Steemer K. 2009. Climate Information for Improved Planning and Management of Mega Cities. World Climate Conference 3 – Better Information for a Better Future. Geneva, Switzerland, 31 August-4 September 2009.
16. Garb Y. Essa S. and **Erell E.** 2010. The dynamics of solar water heating adoption: comparing Amman and Ramallah. 16th Sede Boqer Symposium on Solar Electricity Production, February 14-16, 2010.
17. Shashua-Bar L., Pearlmutter D. and **Erell E.** 2010. Assessing the water consumption of landscape strategies in arid regions and their contribution to thermal comfort in small urban spaces. Bridging Diversity in a Globalizing World – Regional Conference of the International Geographical Union, Tel Aviv, July 12-16 2010.
18. **Erell, E.** 2012. Accounting for urban microclimate in computer simulation of building energy performance. Seminar on Impacts of Environmental Change on Building Design and the HVAC Systems, ASHRAE Annual Conference, San Antonio, Tx., June 23-27 2012.
19. **Erell, E**. 2012. Water-sensitive urban design: Effect of surface moisture and vegetation on thermal comfort in desert cities. 4th International Conference on Drylands, Deserts & Desertification, Sde Boqer, November 12-15 2012.
20. **Erell E.** and Williamson, T. 2014. A ‘green sol-air’ temperature to estimate the radiation effect of ground cover vegetation on pedestrian thermal comfort in hot climates. 20th Internation Congress of Biometeorology, Cleveland, Ohio, September 28-October 1 2014.
21. Kaplan S., Peeters A. and **Erell E.** 2016. Predicting air temperature simultaneously for multiple locations in an urban environment: a bottom up approach. Fourth International Conference on Remote Sensing and Geoinformation of Environment (RSCY2016), Cyprus, April 4-8, 2016.
22. Dorman M., Vulkan A., **Erell E**. and Kloog I. 2017. ‘shadow’: R Package for Geometric Shade Calculations in an Urban Environment. useR! 2017 Conference, Brussels, Belgium, July 4-7, 2017.
23. **Erell E.**, Kaplan S. and Peeters A. 2017. 'Satellite', 'Surface' or 'Simulation': mapng intra-urban variability of the microclimate. Cities and Climate Conference 2017, Potsdam, Germany, September 19-21, 2017.
24. **Erell E.** 2018. Urban Heat Island mitigation: Looking beyond policies to lower air temperature. Cities and Climate Change Science Conference, Edmonton, Canada, March 5-7, 2018.

25. Krayenhoff S., Broadbent A., **Erell E.**, Zhao L., Georgescu M., Middel A., Voogt J., Martilli A. and Sailor D. 2018. Urban cooling from heat mitigation strategies: Systematic review of the numerical modeling literature. 10th International Conference on Urban Climate/ 14th Symposium on the Urban Environment, New York City, Aug. 6-10 2018.
26. **Erell E.**, Kaplan S. Zhou B. and Peeters A. 2018. 'Surface', 'Satellite' or 'Simulation': Mapng Intra-urban Microclimate Variability in a Desert City. 10th International Conference on Urban Climate/ 14th Symposium on the Urban Environment, New York City, Aug. 6-10 2018.
27. Zhou B., Kaplan S., Peeters A., Kloog I. and **Erell E.** 2019. Estimating intra-urban microclimate variability in a desert city using a bottom-up multi-method approach. The EGU General Assembly 2019, Vienna, Austria, April 7–12 2019.
28. **Erell E.** 2020. Generating high-resolution urban microclimate data for building energy simulation at a city scale. ASHRAE Winter Conference, Orlando, Fl., Jan. 31 – Feb. 5 2020.
29. **Erell E.** 2021. Cooling Hot Cities: A Systematic and Critical Review of the Numerical Modelling Literature. ASHRAE Winter Conference (virtual), Chicago, Il., Feb. 9-11 2021.

***(c) Presentations at informal international seminars and workshops***

1. Etzion Y., **Erell E.** 1994. Summer Cooling and Winter Heating With a Single System. Business Seminar on Advanced Heating and Cooling Technologies for Buildings in the Mediterranean Countries, Nicosia, Cyprus, June 21-22, 1994.
2. **Erell E.** 1998. Energy in buildings: selected research projects. Innovations in Energy – Business Opportunities for Industry and Building Construction, Tel Aviv, July 28, 1998.
3. **Erell E.** and Etzion Y. 2001. Progress in Development of a Reversible, Solar-screen Glazing System (SOLVENT). Building Energy Research, Joint FP5 ENERGIE Info-day and ENERBUILD RTD Project Meeting, Malmo, Sweden, September 6-7, 2001.
4. **Erell E.** and Etzion Y. 2002. Implementation of the SOLVENT glazing system: A user-friendly design tool. ENERBUILD RTD project meeting, Lyon, France, October 22-23, 2002.
5. **Erell E.** 2003. Legislation vs. innovation: Are they compatible? A case study: The design of the Blaustein International Center for Desert Studies Building. Symposium on Energy-saving Legislation in Buildings, EU and Israel, Tel Aviv, September 15 2003.
6. **Erell E.** and Etzion Y. 2003. SOLVENT: Development of a reversible, solar-screen glazing system. Symposium on Energy-saving Legislation in Buildings, EU and Israel, Tel Aviv, September 15 2003.
7. **Erell E.** 2003. Cooling through the roof. Symposium on Natural Cooling by Design, London, UK, March 21-22, 2003.
8. **Erell E.** and Meir, I. 2004. Learning from solar buildings at Sde Boqer. Workshop on Solar Thermal Energy, Tel Aviv, May 24 2004.

9. **Erell E.** and Williamson T. 2005. Experimental validation of a model to adapt measured data at a standard weather station to represent site-specific air temperature in an urban street canyon. In Bloem, J. and Sutherland, G. (Eds.) Proceedings of DYNASTEE 2005 – Dynamic Analysis, Simulation and Testing applied to the Energy and Environmental performance of buildings, Athens, Greece, October 12-14 2005.
10. **Erell E.** 2005. Principles of sustainable building in deserts. Green Building Workshop, Tel Aviv, Israel, September 4-6 2005.
11. **Erell E.** 2007. Israel Standard 5282 – Energy rating of buildings. MED-ENEC Capacity Building Workshop: Political and Economic Framework Conditions for Energy Efficiency in and Renewable Energies in Buildings, Cairo, Egypt, May 22-23 2007.
12. **Erell E.** 2008. Principles of urban design and microclimate in modern desert cities. MED-ENEC Capacity Building Workshop: Energy Efficient Buildings and Green Cities: Success Factors and Policy/Planning Tools, Aqaba, Jordan, April 16-17 2008.
13. **Erell E.** 2008. Passive or hybrid downdraft cooling (PHDC) at the Blaustein Institutes for Desert Research administration building, Sde Boqer, Israel. Symposium on **'**Passive Hybrid Evaporative Cooling in Buildings: Project PHDC' , Instituto de Ciencias de la Construcción Eduardo Torroja, Madrid, Spain, November 13, 2008.
14. **Erell E.** 2010. Understanding Urban Microclimate and its implications for planning and design. Israel Meteorological Service: International Workshop on the Application of Meteorological Information to Green Energy and Green Building. Midreshet Ben Gurion, November 24, 2010.
15. **Erell E.** 2011. Getting the most 'bang for the bucket': The role of vegetation in microclimatic design of dry cities. The Jewish National Fund (KKL) and Monash University, Melbourne: Workshop on Creating Water Sensitive Cities in Israel. Ramat Gan, Israel, April 4-5 2011.
16. **Erell E**., Zhou B. and Peeters A. 2018. Green-Blue Urban Infrastructure: A Systematic Approach to Heat Mitigation by Water-Sensitive Urban Design. PLEA 2018 Pre-conference workshop, Hong Kong, December 9 2018.
17. **Erell E.** (2020). The Effect of Increasing Vegetation Cover on Energy Demand for HVAC in a Dense Mediterranean City. IBPSA Performance Bubble, A symposium on building performance simulation and design practice. Houston, Nov 12-13, 2020.

***(d) Invited seminar presentations at universities and institutions***

International:

1. **Erell E.** 1999. The Effect of buildings on the deposition of dust in a desert city. Research Symposium '99, The University of Adelaide, School of Architecture, Landscape Architecture and Urban Planning.
2. **Erell E.** 2004. Predicting Air Temperature in City Streets on the Basis of Measured Reference Data. The University of Adelaide, School of Architecture, Landscape Architecture and Urban Planning.
3. **Erell E.** 2010. Net Zero Energy Footprint: Buildings Shaped by Climate - Modern Desert Architecture in Israel. Public lecture, University of Oklahoma, USA.

4. **Erell E.** 2010. Weather data – are users getting what they really need? Simulating urban microclimate for building design. The School of Meteorology and The National Weather Center, Univresity of Oklahoma, USA.
5. **Erell E.** 2010. In pursuit of the net zero energy house: Lessons learned from architectural design and urban planning in the Negev Desert. Dream Course lecture at the School of Aerospace and Mechanical Engineering, University of Oklahoma.
6. **Erell E.** 2011. Application of urban climate modelling in building energy simulation and outdoor thermal comfort studies. Portland State University, Mechanical and Materials Engineering Seminar, Turbulence and Wind Energy Series.
7. **Erell E.** 2012. In Pursuit of the Net Zero Energy House: Lessons learned from architectural design and urban planning in the Negev Desert. Portland State University, Mechanical and Materials Engineering Seminar Series.
8. **Erell E.** 2013. Implementing Urban Climatology in the 'Real World': Theory and Practice. National Centre for Meteorological Research (CNRM), Toulouse, France, Nov. 7 2013.
9. **Erell E.** 2014. Urban microclimate and urban planning: The difficulties faced by architects, planners and students of arch in applying the knowledge of climatologists. Graduate School of Design, Harvard University, Oct. 7 2014.
10. **Erell E.** 2014) Urban microclimate and urban design: the effects of landscang and vegetation on pedestrian thermal comfort. Karlsruhe Institute of Technology, Germany, as part of seminar series Karlsruher Vortragsreihe - Forschung und Praxis in Wasserbau und Wasserwirtschaft, jointly organized by the Institute for Hydromechanics and Institute for Water and River Basin Management, Oct. 9 2014.
11. **Erell E.** 2016. How important is urban air temperature? The annual Malcolm L. Comeaux Lecture, School of Geographical Sciences and Urban Planning, Arizona State University, March 18 2016.
12. **Erell E.** 2019. Complexity and contradiction in environmental design of the built environment. Departamento de Construção Civil, Universidade Tecnológica Federal do Paraná – UTFPR, Curitiba, Brazil, September 27 2019.

In Israel:

13. **Erell E.** 2006. CAT: A model for predicting air temperature in city streets from measured reference data. Tel Aviv University, Dept. of Geography.
14. **Erell E.** 2008. Predicting air temperature in city streets from measured reference data in the region. Ben Gurion University, Dept. of Geography and Environmental Development.
15. **Erell E.** 2010. Urban microclimate and urban planning: The difficulties faced by architects, planners and students of architecture in applying the knowledge and insights of climatologists. Technion - Israel Institute of Technology, Faculty of Architecture and Town Planning: The fourth seminar on teaching architecture as a means of promoting sustainability.
16. **Erell E.** 2014. Impact of Increasing the Height of Tel Aviv Buildings on Pedestrian Comfort and Building Energy Efficiency. Ben Gurion University, Dept. of Geography and Environmental Development.

17. **Erell E.** 2015. How important is urban air temperature? Ben Gurion University, Alexandre Yersin Department of Solar Energy and Environmental Physics seminar series.
18. **Erell E.** 2018. Getting more 'bang for the bucket': Water sensitive urban design in dry cities. The Hebrew University – Faculty of Agriculture, Food and Environment. Rehovot, December 21 2018.
19. **Erell E.** 2019. Complexity and contradiction in environmental design of the built environment. Tel Aviv University, Dept. of Geography, January 21 2020.
20. **Erell E.** 2021. Mitigation and adaptation to climate change and urban heat islands: Complexity and contradiction in environmental design of the built environment. The Hebrew University – Faculty of Agriculture, Food and Environment. Rehovot, Jan. 21 2021.

## RESEARCH GRANTS

### Competitive

1996-1998 EU - DG XII, under the Joule-Thermie Program: Etzion Y. and **Erell E.** (with teams from 6 other research institutions): ROOSOL - Roof Solutions for natural cooling. Annual amount $78,575, total $170,250.

1999-2001 EU – DG XII: **Erell E.** and Etzion Y. : SOLVENT – a ventilated solar screen window. Primary contractor and project coordinator. Annual amount $54,785, total $137,000. (total value of project involving research teams from 6 institutions - $600,250).

2001-2002 EU – DG XVII, ALTENER II Energy Program: Yannas S. , Molina J. , **Erell, E.** : Roof Designs for Natural Cooling: Design Handbook and Applicability Maps. Architectural Association Graduate School, London. Annual amount $8,500, total $17,000.

2001-2003 Israel Ministry of Science, Culture and Sport: Etzion Y. , Tambour Y. **Erell E.** and Pearlmutter D. : Multi Stage Down Draft Evaporative Cooling Tower for Cooling Large Enclosed and Semi-Enclosed Spaces. Annual amount $49,000, total $147,000.

2017-2020 Israel Ministry for Science Technology and Space: Kloog I., **Erell E.** and Novack V.: The Effects of Urban Microclimate Variability and Global Climate Change on Heat-Related Cardiovascular Outcomes in the Semi-Arid Environment of Southern Israel. Annual amount $118,350, total $355,000.

### Other

1989-1990 Israel Ministry of Energy and Infrastructure: Etzion Y. , **Erell E.**, Pearlmutter D. Monitoring Temperatures and Backup Heating Requirements in an Earth-Bermed Building in Sde-Boqer. Annual amount $23,333, total $35,000.

1997 Israel Ministry of Energy and Infrastructure: Etzion Y. , **Erell E.**, Pearlmutter D., Meir, I. Monitoring Climatic Aspects of the Design and Construction of the New Town of Modi'in. Total $20,000.

1998-1999 Israel Ministry of the Environment: Etzion Y. and **Erell E.** Mapng the potential for green construction in Israel. Annual amount $21,425, total $42,850.

2000-2001 Israel Foundations Trustees: Portnov B. and **Erell E.** Interregional Inequalities in Israel in 1948-95: Convergence or Divergence. Annual amount $11,800, total $23,600.

2004-2005 Israel Ministry for National Infrastructures: Etzion Y. , Meir I. , **Erell E.** and Pearlmutter D. : Design Manual for Bio-Climatic Construction. Annual amount $36,600, total $73,200.

2006-2008 Israel Ministry for National Infrastructures: **Erell E.** : Daylighting for visual comfort and energy conservation in offices in sunny locations. Annual amount $27,500, total $82,500.

2008-2009 EU: **Erell E.** Promotion and Dissemination of Passive and Hybrid Down-draught Cooling in buildings (PHDC). Annual amount $7,000, total $14,000.

2009-2011 Israel Ministry for National Infrastructures: **Erell E.** and Becker N. : Retrofit of Residential Buildings in Israel for Energy Conservation. Annual amount $25,600, total $76,800.

2011-2013 Israel Ministry for Environmental Protection: Garb Y., Pearlmutter D., **Erell E.** and Becker N.: Survey of green building incentives and their adaptation to Israel. Annual amount $28,900, total $86,700.

2013-2015 Israel Ministry for Energy and Water: **Erell E.** and Portnov B.: Promoting Energy-Saving Behaviour in Residential Buildings in Israel. Annual amount $28,300, total $84,900.

2013 Israel Ministry for Energy and Water: **Erell E.**: Energy Conservation in Residential Buildings – a design manual. Total $79,550.

2015-2018 Jewish National Fund: **Erell E.**: Exploring urban design solutions for water sensitive innovations. Annual amount $72,000, total $216,000. (Note: The project is part of consortium for Creating Water Sensitive Cities in Israel, with partners in several other universities in Israel.)

2016-2018 Israel Ministry for National Infrastructures, Energy and Water: **Erell E.** and Kloog, I.: The potential for PV installation in residential buildings in dense urban areas. Annual amount $30,550, total $91,700.

2019-2021 Israel Ministry for National Infrastructures, Energy and Water: **Erell E.** and Kissinger M.: The Effect of Green Building on Electricity in Residential Buildings in Israel. Annual amount $69,500, total $208,500.

## PRESENT ACADEMIC ACTIVITIES

### *(a) Research in progress*

*Water sensitive urban design*

To achieve substantial environmental benefits from storm water runoff in Israeli cities, solutions must be found to adapt the infrastructure of existing urban areas. When new neighborhoods are planned, a hierarchy of flow paths can be designed to link catchment areas at different physical scales to collection areas where the water may be stored (as groundwater by aquifer recharge or alternatively as above ground storage). In existing built-up areas, such pathways may not be easily discernible, and there may be no suitable collection areas at the appropriate scale. This project seeks to promote water-sensitive planning by developing and

demonstrating a methodology that addresses two questions: a) How can an integrated and comprehensive network of water pathways, collection areas and storage be identified and mapped onto an existing urban area? b) What are the most effective patterns of implementing water sensitive urban design (WSUD) elements in existing areas in terms of improvement of pedestrian thermal comfort and reduction of energy demand of buildings? These questions will be explored by computer simulation in the context of dense urban development characteristic of Israeli cities, where exposed land is relatively scarce and green open space is limited.

*Heat and health*

Scientific consensus strongly supports the scenario that climate change will lead to warmer air temperature and more extreme weather events with greater heat stress, which are associated with increased morbidity and mortality. Increases in air temperature may elevate the risk of cardiovascular outcomes, including stroke, acute coronary syndrome and cardiac death. However, current epidemiological studies on the health effects of increased air temperature are limited by the lack of sufficiently detailed weather data – in space and time – from which the actual exposure of individuals to heat stress can be estimated. A study funded by the Israel Ministry of Science and carried out in collaboration with Prof. Novack at Soroka Medical Center and Prof. Kloog at BGU with will provide an evaluation of the effects of extreme temperature and heat stress in Southern Israel on cardiovascular outcomes. In particular, it will clarify whether mean, extreme, minimum and maximum values, as well as variability of temperature, are of relevance for such outcomes, to identify critical exposure windows and to propose more effective public health policies dealing with heat.

*Green buildings and energy conservation*

Israel's green building standard has many benefits, but the predicted energy saving may not materialize: there has been no large-scale study in the country to assess actual saving in residential buildings, particularly due to reduction in air conditioning and heating. A study supported by the Ministry of Energy seeks to establish actual energy saving from green buildings. In addition, it will provide a detailed picture of the breakdown of home electricity use and factors affecting it; develop a model for long-term forecast of electricity demand that incorporates behavior, demographics, economics and, for the first time in Israel, building characteristics; and assess the efficacy of Israel's energy rating system and propose, if necessary, modifications to occupancy and climatization assumptions.

***(b) Books and articles to be published***

Articles submitted:

- Bogin D., Kissinger M. and Erell E. Lifestyle and residential electricity consumption in a dry Mediterranean city. *Energy Policy*, submitted.
- Erell E. and Zhou B. The effect of increasing plant cover on urban microclimate and energy demand for heating and cooling in a Mediterranean city. *Energy and Buildings*, submitted.

Manuscripts in preparation:

- Occupant perception of a hybrid cooling system based on ceiling-mounted radiant cooling panels coupled to a roof pond.
- Measuring the impact of trees on localized air temperature in the city.

## ADDITIONAL INFORMATION

### *(a) Professional publications*

Architects do not often consult acamic publications in peer-reviewed journals. To reach this audience and to promote the dissemination of my research results beyond the narrow research community, I have collaborated or led in the publication of several books addressed to both the professional design community and to students. My work on roof-mounted passive cooling, especially with respect to radiative cooling, comprises a substantial part of a book funded by the EU within the ALTENER program, titled Roof Designs for Natural Cooling: Design Handbook and Applicability Maps (Yannas *et al*., 2005). I co-authored a design manual in Hebrew on green building, funded by the Israel Ministry for National Infrastructures (Pearlmutter et al, 2010), and recently completed a comprehensive guide to energy conservation in residential buildings, also funded by the same Ministry. A book titled Urban Microclimate – Designing the Spaces between Buildings (Erell *et al*, 2010) published by a leading publisher in London of books on environmental issues seeks to address the gap between research and application. The book has been cited in nearly 400 academic research papers (GS), an indication of its widespread use.

### *(b) Contributions to society*

Architects are considered by many to be 'artists', while others perceive them as being more closely aligned to engineering. My academic work aligns me with the second approach, and my research on energy in the built environment has provided the basis for my primary extra-curricular work. Over the years, I have contributed extensively to drafting and updating national standards on various aspects of energy in buildings: thermal insulation, energy labelling of buildings, green buildings and energy performance of glazing systems. The time devoted to these activities – in a volunteer capacity as a member of expert committees at the Standards Institute of Israel - has been substantial, but I have had the satisfaction of being responsible, in a modest way, to the gradual transformation of the building construction industry as the standards were applied.

I have also promoted the practical application of my research on energy conservation in buildings by means of professional design guides. These publications are listed under 'Non-refereed professional articles and publications' (see Pearlmutter et al, 2010; Erell and Kaftan, 2012; and Erell, 2015). The latter, in particular, though not a refereed book, is a very comprehensive reference and is widely used by architects and green building consultants in Israel.

### *(c) Experimental architecture and design projects*

2000-2009 Etzion Y., Meir I. and **Erell E.**, Detailed town plan, Ramot Neighborhood, Be'er Sheva, under contract from the Ministry of Housing, Israel (not yet constructed).

1994-1999 Etzion Y., **Erell E.**, Meir I.A., Pearlmutter D., Binder M. and Belaish M., Jewish National Fund Youth Camp at Beer Ora, under contract from the Jewish National Fund (not built).

1992-1994 Etzion Y., **Erell E.**, Arbel A., Belaish M., Meir I., Pearlmutter D., Energy Conserving Apartment House in Jaffa - experimental design and demonstration project, under contract from Israel Ministry of Energy and Infrastructure (not built).

1991-1992 Meir I., Arbel A., Belaish M., **Erell E.**, Pearlmutter D. Kibbutz Samar - library.

1991-1992 **Erell E.**, Pearlmutter D., Meir I., Arbel A. The Miriam and Ed Vickar Demonstration Center for Reclamation of the Desert at Sde-Boqer.

1988-1990 Etzion Y., **Erell E.**, Pearlmutter D., Meir, I., Belaish M. A Solar Nursery School, Netivot, under contract from the Ministry of Housing, Israel.

1989-1990 Etzion Y., **Erell E.**, Meir I., Pearlmutter D., The Jacob Blaustein International Center for Desert Studies Building, Sde-Boqer.

1987-1988 Weingarten D., Etzion Y., **Erell E.**, The Zuckerman Community Center, Sde-Boqer.

## SYNOPSIS OF RESEARCH

(including reference to publications and grants in above lists)

### Description of the scientific field

Architecture is usually perceived as an art or a profession, rather than as an academic discipline. Thus, there is little research in architecture *per se*, and research papers generally seek to apply relevant insights from other fields. Architecture also differs from other disciplines in that expertise cannot be applied in isolation: Successful designs for the built environment cannot be achieved through focused excellence in any one aspect alone. My research over the years reflects this unique characteristic of architecture: while it has addressed many facets of **energy in the built environment**, it has typically sought to bridge the gaps between diverse and typically distinct research fields. The common thread in this work is that it has dealt with flows of energy at different scales, and how they affect the spaces we occupy, both indoors and outside.

*Energy in buildings*

My academic career began with research on passive cooling of buildings. Roofs are a primary source of undesirable energy absorption, leading to overheating of buildings in hot climates. However, the roof is also the best location for installing various cooling systems. Experiments were carried out for nearly ten years in a project aimed at cooling buildings by ***nocturnal long-wave radiation***. A system was developed which consists of a shallow roof pond, insulated from the environment with flat plate collectors exposed to the sky, through which the water circulated at night is cooled by long-wave radiation and convection (Erell and Etzion, 1992). Preliminary investigations indicated that the radiative cooling system using roof ponds, with no physical modifications, could supply a significant portion of winter heating requirements in areas where summers are hot, yet winters cold enough to require heating systems (Etzion and Erell, 1996). Further modifications to the radiative cooling system (Etzion and Erell, 1999; Erell and Etzion, 2000), and an innovative evaporative cooling system, were tested within the framework of the ROOFSOL (Roof Solutions for Natural Cooling) project, funded by the European Union and carried out in collaboration with researchers from six other research institutions in Europe. The project was aimed at developing and testing roof systems suitable for use in Mediterranean or desert climates, which use natural cooling techniques to extract unwanted heat from buildings, and culminated in the publication in London of a book titled Roof Cooling Solutions (Yannas et al, 2006).

In contemporary architecture in hot dry locations, ***evaporative cooling*** of interiors is usually carried out with mechanical equipment. In order to demonstrate the application of evaporative cooling to exterior or large semi-enclosed spaces, a down-draft evaporative cooling tower was

designed and integrated into a 500 $m^2$ glazed courtyard in a multi-use building complex at the Sde-Boqer Campus (Etzion *et al.*, 1997). Performance analysis of this tower showed dry bulb temperature reductions of up to 14$^o$C, a peak cooling output of over 100 kW with a cooling efficiency of 85-90% during all hours of operation, and a water consumption of 1-2 $m^3$/day. Research was carried out on the design a wind capture mechanism to increase the air supply and reduce reliance on mechanical circulation (Pearlmutter *et al.*, 1996). The cool tower was later modified to accommodate two inlets, to allow greater efficiency of water use when cooling semi-enclosed spaces (Erell *et al*, 2008; Pearlmutter *et al*, 2008).

Large glazed areas incorporated for passive heating may also have an advere effect on ***visual comfort***, especially in sunny cimates such as Israel. A novel reversible glazing system was developed to address this problem, based on converting short-wave solar radiation to convective heat and long wave radiation (Etzion and Erell, 2000). Further development of the concept was supported by a grant from the EU in the SOLVENT project (Erell *et al*, 2003; Leal et al, 2004). A subsequent study, funded by the Israel Ministry of Energy, was initiated to improve energy efficiency and increase productivity in office buildings by making better use of the potential for daylighting. Unlike overcast climates, in Israel simply installing large glazed areas is not enough: Intense glare and high mean radiant temperatures often result in windows being blocked off entirely by occupants, so that large glazed areas cause an increase in cooling loads without providing the benefits of daylighting. An empirical index to predict the response of occupants to the changing visual environment was tested and calibrated in the highly luminous conditions often found in Israel (Erell and Kaftan, 2013; Erell et al, 2014). The research has now been incorporated in a multi-national project to assess glare ratings in daylit offices. The journal paper describing this effort (Wienold et al, 2019) was awarded the Leon Gaster Award by the Society of Light and Lighting (CIBSE) for 2019.

To achieve a substantial saving in energy, a large proportion of existing buildings must be ***retrofitted***, too. This is because even if all new construction were to be carried out according to current best practice, many years would pass before the improvement in building construction would be translated into a substantial reduction in the requirement for energy at a national level. Research funded by the Israel Ministry of Energy investigated the feasibility of energy conservation through the retrofit of existing residential buildings. The research comprised three tasks: Analysis of the economic benefits to the individual of retrofitting an existing building (Friedman et al, 2014); Examination of the social and environmental aspects of building retrofit, and their effects on the willingness of the individual to pay for the renovation (Friedman et al, 2018); and policy recommendations on the means for promoting energy retrofit of existing residential buildings.

The conventional energy-saving paradigm suggests that if building envelopes are constructed to a higher standard, following precise technical guidelines laid out in standards, buildings will consume less energy. This assumption, which ignores the role (and responsibility) of building' residents, is likely to be misleading. In particular, over-confidence in building standards and regulations means that other, more effective measures of achieving energy-saving policy objectives might be left unexplored. A study funded by the Israel Minstry of Energy demonstrated that although substantial energy savings may be in fact achieved by ***modifying the behavior*** of home occupants, such savings are contingent on appropriate measures to educate and motivate them, and are very difficult to achieve in practice (Erell et al, 2018). An ongoing study funded by the Ministry of Energy (Erell and Kissinger) seeks to establish the actual extent of saving in Israel from green buildings.

Buildings construction in Israel is highly regulated. A study of ***green building incentives***, and in particular standards for energy in buildings, demonstrated that there is an assumed

equivalence between ‘green buildings’ and energy efficiency, which is not necessarily justified (Goulden et al, 2016). Furthermore, there is over-reliance on building energy simulation and a failure to recognize inherent uncertainty in the procedures (Goulden et al, 2019). The study, funded by the Israel Ministry of Environmental Protection, took place during a period of great flux in the green building policy landscape in Israel, which is presently culminating in the adoption of a mandatory national standard.

*Urban microclimate*

The energy performance of buildings is affected by their exposure to the environment. In cities, the unique microclimate of built-up areas may have a substantial effect on the behaviour of building systems. This aspect of design has only recently begun to receive the attention of researchers, but practical implementation is still in its infancy. My research first focused on the **microclimate of an urban street canyon**, culminating in a complete model of all energy exchanges in such spaces which allows detailed predictions of temperature, humidity and airflow on the basis of measured data from a reference weather station in the region (Erell & Williamson, 2006; 2007). This model was later extended to allow partial description of the effects of moisture and vegetation (Erell et al 2009, 2010). The model has been expanded to allow analysis of multiple locations (Kaplan et al, 2016; Zhou et al, 2019) and now includes a detailed analysis of sub-surface moisture and heat (Leaf and Erell, 2018).

I have engaged in studies of the effect of different landscaping strategies in desert areas on microclimate and thermal comfort. The studies have investigated small, relatively enclosed courtyards (Shashua-Bar et al, 2009; 2011), and demonstrated that the contribution of vegetation is primarily expressed through modification of radiant exchange, while the contribution to thermal comfort of reduction in air temperature is less important. A subsequent study has investigated alternative ground covers, showing that in a desert environment some succulents provide more effective alternatives than grass (Snir et al, 2016).

The practical application of urban climate research in urban planning was the subject of several papers (Erell, 2008; Mills et al, 2010). A broad overview of this topic is at the core of the book ‘Urban Microclimate – Designing the spaces between Buildings (Erell et al, 2011). Although the book was intended primarily as a teaching resource and a reference for urban planners, it has become a valuable reference for researchers as well, and has been cited over 400 times in research papers.

*Integration*

As noted in the introduction to this synopsis, my research has typically sought to bridge the gaps between diverse and typically distinct research fields, whose common thread is flows of energy at different scales and how they affect the spaces we occupy. The importance of such an integrated approach has been recognized, and I have been invited to give several keynote lectures and seminar presentations on this theme at international events: In Hong Kong (2011), Tallin (2013), Harvard (2015), UCLA (2016), Brazil (2019) and Adelaide (2019). Humans occupy built space, which they modify, intentionally or unintentionally, to create a microclimate that is adapted to our needs. This is best addressed at multiple levels, combining analysis of building components (such as fenestration), building design and outdoor urban spaces – in all cases related to the needs of humans interacting with them.Architecture is usually perceived as an art or a profession, rather than as an academic discipline. Thus, there is little research in architecture *per se*, and research papers generally seek to apply relevant insights from other fields. Architecture also differs from other disciplines in that expertise cannot be applied in isolation: Successful designs for the built environment cannot be achieved through focused excellence in any one aspect alone. My research over the years reflects this unique

characteristic of architecture: while it has addressed many facets of **energy in the built environment**, it has typically sought to bridge the gaps between diverse and typically distinct research fields. The common thread in this work is that it has dealt with flows of energy at different scales, and how they affect the spaces we occupy, both indoors and outside.

## TEACHING STATEMENT

The role of university faculty may be considered as having three components: generating knowledge (through research); disseminating this knowledge (publications, teaching and consulting); and training the next generation of researchers.

I consider teaching a privilige, and have always enjoyed interaction with students in class. I have always encouraged, not to say required, critical thinking by my students. My classes are not primarily about transfering knowledge – this can now be obtained online, and my presentations are easily accessible. Rather, classroom time is designed to question concepts, to test preconceptions and to generate discussion.

My interaction with students has always included a survey I devised in which I ask them for detailed feedback on each class or presentation during the semerster, indicating which toc they found difficult. The survey, returned to me before the end of term exam, may be completed while they study for the test, and is rewarded by a bonus to their term score. Unlike generic feedback from student surveys carried out by the University (which has been consistently very positive!), my personal feedback system has provided me with direct insight into student perception of specific tocs in my class.

My approach to graduate students has likewise been focused on their development as potential researchers and as individuals. I have encouraged them to spend time reading and proposing their own research tocs (within my academic expertise). When I have funded research, I have encouraged them to find their own niche in the project, and their individual interest has taken precedence over my research agenda wherever possible.

Note:

During the first 15 years of at Ben-Gurion University, I was employed as a researcher at the Jacob Blaustein Institutes for Desert Research, and had no formal teaching responsibilities. This changed gradually after 2001, and the transition was completed after my appointment in 2005 as Associate Professor, when I became eligible to supervise graduate students.