Name: Mashor Housh   **Date:** April 15, 2019

CURRICULUM VITAE

1. Personal Details

Permanent Home Address: 15 Almar St., Kfar-Manda, Israel 17907

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2. Higher Education

a. Undergraduate and Graduate Studies

Period of Study	Name of Institution and Department	Degree
2002-2007	Civil and Environmental Engineering, Technion	B.Sc., Cum Laude
2007-2011	Civil and Environmental Engineering, Technion	Ph.D. (direct Ph.D. program)

b. Post-Doctoral Studies

Period of Study	Name of Institution and Department/Lab	Name of Host
2011-2013	CEE, University of Illinois at Urbana-Champaign	Prof. Ximing Cai

3. Academic Ranks and Tenure in Institutes of Higher Education

Years	Name of Institution and Department	Rank/Position
2013-2017	University of Haifa, Department of natural resources and environmental management	Lecturer
2018-Present	University of Haifa, Department of natural resources and environmental management	Senior Lecturer

Notes: * represents activities and publications since last appointment.

4. Offices in Academic Administration

Years	Name of Institution and Department	Role
*2017-Present	Global Green MBA, University of Haifa, Faculty of Management	Head

5. Non-Academic Professional Activities

*2014-Present	Consulter for the Israeli Water Authority: Development and implementation of a suite of models for optimal operation of the National Water System

6. Scholarly Positions and Activities outside the University

Years	Memberships in Academic Professional Associations
2011-Present	American Society of Civil Engineers (ASCE)
2011-Present	The Operations Research Society of Israel (ORSIS).
2011-Present	Environmental and Water Research Institute (EWRI).
2012-Present	Standing Committee on Environmental and Water Resources systems, ASCE
*2014-Present	The Institute for Operations Research and the Management Sciences (INFORMS).
*2014-Present	Grand Water Research Institute (GWRI).
*2014-Present	Standing Committee on Water Distribution Systems Analysis, ASCE
*2014-Present	Task Committee on "Using Hydroclimatic Prediction for Water Systems Operations and Management", EWRI-ASCE
*2017-Present	Member of COST Action (EU), CA16209 : Natural Flood Retention on Private Land. http://www.land4flood.eu/

Years	Reviewing for Refereed Journal
2011-Present	*The Journal of Water Resources Planning &Management* **IF 2015= 2.521** **R 2015= Engineering, Civil: 9/126 (Q1)**
2012-Present	*Water Resources Research* **IF 2015= 3.792** **R 2015= Limnology: 1/20 (Q1)**
2012-Present	*Water Research* **IF 2015= 5.991** **R 2015= Water Resources: 1/85 (Q1)**
2012-Present	*Journal of Environmental Modeling and Software* **IF 2015= 4.207** **R 2015= Computer Science, Interdisciplinary Applications: 6/104 (Q1)**

2012-Present	*Advances in Water Resources* **IF 2015= 4.349** **R 2015= Water Resources: 3/85 (Q1)**
2012-Present	*Engineering Optimization* **IF 2015= 1.380** **R 2015=Engineering, Multidisciplinary: 32/85 (Q2)**
*2014-Present	*Urban Water Journal* **IF 2015= 1.478** **R 2015= Water Resources: 37/85 (Q2)**
*2015-Present	*Journal of Hydrology* **IF 2015= 3.043** **R 2015= Engineering, Civil: 5/126 (Q1)**

7. **Active Participation in Scholarly Conferences**

a1. **International Conferences - Held Abroad**
Note: presenter is underlined

Date	Name of Conference	Place of Conference	Subject of Lecture/Discussion	Role
Dec. 3-7, 2009	The American Geophysical Union (AGU) Annual Meeting	San Francisco, California, USA	Shamir U., Housh M., Ostfeld A., Zaide M., (2009), Management of the Israeli National Water System under Uncertainty	Presentation
May 20-26, 2011	World Environmental and Water Resources Congress	Palm Springs, California, USA.	1. Housh M., Ostfeld A., and Shamir U., (2011), Optimal management of a water supply system under uncertainty: stochastic approach 2. Housh M., Ostfeld A., and Shamir U., (2011), Optimal multi-year management of a water supply system under uncertainty: Robust counterpart approach 3. Housh M., Ostfeld A., and Shamir U., (2011), Search method for box-constrained optimization	Presentation

			4. <u>Housh M.</u>, Ostfeld A., and Shamir U., (2011), Limited multi-stage programming: a case study for multiyear management of water supply system 5. <u>Housh M.</u>, Ostfeld A., and Shamir U., (2011), Optimal management of a water supply system under uncertainty: the Info-Gap approach 6. <u>Housh M.</u>, Ostfeld A., and Shamir U., (2011), Multi-year optimal management of quantities and salinities in water supply systems	
May 20-24, 2012	World Environmental and Water Resources Congress	Albuquerque, New Mexico, USA.	<u>Housh M.</u>, Ostfeld A., and Shamir, U., (2012),Optimal multi-year management of a regional water supply system under uncertainty: the affine adjustable robust counterpart approach	Presentation
Sep. 24-27, 2012	14th Water Distribution Systems Analysis Conference	Adelaide, South Australia	1. Arad J., Housh M., Perelman L., and <u>Ostfeld A.</u>, (2012), Contamination event detection utilizing Genetic Algorithm 2. Perelman L., Housh M., Oliker N., and <u>Ostfeld A.</u>, (2012), Non-probabilistic approach for the optimal design of water distribution systems under demand uncertainty 3. Arad J., Housh M., Perelman L., and <u>Ostfeld A.</u>, (2012),	Presentation

			Comparison between Fixed thresholds and Genetic algorithm methods for water quality event detection	
Oct. 14-17, 2012	The Institute of Operations Research and Management Science (INFORMS) Annual Meeting	Phoenix, Arizona, USA.	Housh M., and Cai X., (2012), Smoothing Algorithm to Solve a Complex Model for Regional Biofuel Development	Presentation
Dec. 3-7, 2012	The American Geophysical Union (AGU) Annual Meeting	San Francisco, California, USA	1. Housh M., Ng T.L., and Cai X., (2012), Integrated systems optimization model for biofuel development: The influence of environmental constraints 2. Yaeger M., Housh M., Ng T.L., Cai X., and Sivapalan M., (2012), Water for Food, Energy, and the Environment: Assessing Streamflow Impacts of Increasing Cellulosic Biofuel Crop Production in the Corn Belt 3. Cai X., Zeng R., Valocchi A., Song J., and Housh M., (2012), Strategic Planning for Drought Mitigation under Climate Change	Presentation
April 7-12, 2013	The European Geophysical Union (EGU) General Assembly	Vienna, Austria	Yaeger M., Housh M., Ng T.L., Cai X., and Sivapalan M., (2013), Catchments Under Change: Assessing Impacts and Feedbacks from New Biomass Crops in the Agricultural Midwestern USA	Presentation
May 19-23, 2013	World Environmental and Water	Cincinnati, Ohio, USA.	Perelman L., Housh M., and Ostfeld A., (2013), Explicit Demand	Presentation

	Resources Congress		Uncertainty Formulation for Robust Design of Water Distribution Systems	
*Dec. 3-7, 2013	The American Geophysical Union (AGU) Annual Meeting	San Francisco, California, USA	Yaeger M., Housh M., Noël P., Cai X., and Sivapalan M., (2013), Understanding and Quantifying Hydrological Alteration Caused by Biofuels-Related Land Use Change in the Midwestern US	Poster
*Apr. 23-26, 2014	Dooge Nash International Symposium	Dublin, Ireland	Housh M., Ostfeld A., and Shamir U., (2014), Management of Water Systems under Hydrological Uncertainty	Presentation
*May 21-23, 2014	International Symposium on Communications, Control, and Signal Processing	Athens, Greece	Fagiolini A., Housh M., Ostfeld, A., and Bicchi, A., (2014), Distributed Estimation and Control of Water Distribution Networks by Logical consensus	Presentation
*June 1-5, 2014	World Environmental and Water Resources Congress	Portland, Oregon, USA.	1. Housh M., Yazidi J., (2014), Non-probabilistic approach for flood control system design 2. Housh M., Cai X., (2014), SoS – Biofuel: System of Systems Model for Biofuel Development Analysis	Presentation
*May 17-21, 2015	World Environmental and Water Resources Congress	Austin, Texas, USA.	Housh M., and Ostfeld A., (2015), Utilizing discrete choice models for fusing alarms from multiple water quality indicators	Presentation
*Apr. 17-22, 2016	European Geophysical Union (EGU) General Assembly	Vienna, Austria	Polinova M., Brook A., Housh M., (2016), An integrated modeling framework for real-time irrigation scheduling: the benefit of	Presentation

			spectroscopy and weather forecasts	
*May 22-26, 2016	World Environmental and Water Resources Congress	Palm Beach, Florida, USA.	1. Housh M., Ohar, Z., (2016), Simulating Water Distribution Systems using Differenial Algebric Equations 2. Avni, N., Fishbain, B., Housh, M., Shamir, U., (2016), The Effect of Water Demand Uncertainty on Management of Regional Water Systems	Poster
*July 25, 2016	WSEN 2016: World Student Environmental Network	Keele University, UK	1. Egbariah M., Housh M., Shamir U., Optimal regional management of reclaimed water system with different qualities 2. Shapira N., Housh M., Developing a negotiation support system for environmental-Economics conflicts resolution	Presentation
*May 22-26, 2017	World Environmental and Water Resources Congress	Sacramento, California, USA.	1. Housh M., Ohar Z., Model based approach for Cyber-Physical Attacks Detection in Water Distribution Systems 2. Avni N., Fishbain B., Housh M., Shamir U., Regional Water Supply System Management Under Demand Uncertainty: Using Aggregation Rules to Derive an Operation Policy from Implicit Stochastic Programming Models	Presentation

			3. Housh M., Kronaveter L., <u>Shamir U.</u>, Achipaz Z., Hadad A., Models for management of Israel's national and regional water systems	
*June 2-7, 2018	World Environmental and Water Resources Congress	Minneapolis, Minnesota, USA	1. <u>Housh M.</u>, Salomons E., Optimal dynamic pumps triggers for cost saving and robust operation in WDSs 2. <u>Jamal A.</u>, Linker R., Housh M., Utilizing probabilistic weather forecasting for optimal irrigation scheduling 3. <u>Shafiee-Jood M.</u>, Housh M., Cai X., Meeting Environmental Objectives in Biofuel Development: A Hierarchical Decision Modeling Framework 4. <u>Shafiee-Jood M.</u>, Housh M., Cai X., Integrating multi-time scale forecasts in farmers' decision making	Presentation
*April, 24-26, 2019	4th Open Science Meeting of the Global Land Programme	Bern, Switzerland	<u>Broitman D.</u>, Shapira N., Housh M., The decision-maker matters: An operational Multi-Objective Game Theoretic Model for environmental-economic conflict resolution	Presentation

None

a3. **Local Conferences**

Date	Name of Conference	Place of Conference	Subject of Lecture/Discussion	Role
June 1, 2008	Annual Operations Research Society of Israel (ORSIS)	Jerusalem, Israel	Housh M., Ostfeld A., and Shamir U., (2008), Optimal multi-year management of a water supply system under uncertainty	Presentation
June 3, 2011	Annual Operations Research Society of Israel (ORSIS)	Akko, Israel	Housh M., Ostfeld A., and Shamir U., (2011), Robust Optimization for optimal management of a water supply system under uncertainty	Presentation
*Dec. 21, 2014	The national graduate students conference on water research	Haifa, Israel	Egbariah M., Housh M., Shamir U., Optimal regional management of reclaimed water system with different qualities	Presentation
*Feb. 24, 2015	Natural Resources and Environmental Research Center Workshop on Securing Food Using Non-Conventional Water Sources	Haifa, Israel	Housh M., Kronaveter L., Shamir U., Shoval R., Hadad A., Achipaz Z., (2015), A model for optimal desalination purchase in the Israeli National Water Supply System	Presentation
*Apr. 5, 2016	Israeli Association of Water Resources conference	Haspin, Israel	Housh M., Kronaveter L., Shamir U., Shoval R., Hadad A., Achipaz Z., (2016),	Presentation

			Optimal Management for the freshwater supply system: natural and desalinated water	
*June 21-23, 2016	Israel Society of Ecology and Environmental Sciences	Tel-Aviv, Israel	Silver T., Housh M., Gal G., Space-time dynamic model for analyzing lake Kinneret fishery	Poster
*Dec. 25, 2016	Israeli Geographical Association	Tel-Aviv, Israel	Polinova M., Brook A., Housh M., (2016), Benefits of common use UAV and portable spectrometer in agriculture	Presentation
*Dec. 28, 2016	The national graduate students conference on water research	Haifa, Israel	Avni, N., Fishbain, B., Housh, M., Shamir, U., Regional Water Supply System management under demand uncertainty	Poster
*May 16, 2018	Israeli Association of Water Resources conference	Naveh Eylan, Israel	Housh M., Kronaveter L., Shamir U., , Hadad A., Achipaz Z., (2018), DSS for the planning and management of Kinneret watershed's water system.	Presentation

b. Organization of Conferences or Sessions

Year	Name of Conference	Place of Conference	Subject of Conference	Role
*2015	World Environmental and Water	Florida, USA	Chair for water resources management track	[1]Track Chair (20 sessions)

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[1] As a track chair, I am responsible for organizing a set of sessions (e.g. 20 sessions) in specific topic within a conference. I am organizing the planning and management track in the annual congress of the environmental water research institute.

	Resources Congress			
*2016	World Environmental and Water Resources Congress	California, USA	Chair for water resources management track	[1]Track Chair (20 sessions)
*2016	World Environmental and Water Resources Congress	Florida, USA	Session: Using Hydro-climatic Predictions for Water Resources Systems Planning and Management II	Moderator
*2017	World Environmental and Water Resources Congress	California, USA	Session: Water Resources Management under Uncertainty	Moderator
*2017	World Environmental and Water Resources Congress	Minnesota, USA	Chair for water resources management track	[1]Track Chair (20 sessions)
*2018	World Environmental and Water Resources Congress	Minnesota, USA	Session: Systems Thinking and Modeling Complex Adaptive Systems	Moderator
*2018	World Environmental and Water Resources Congress	Pennsylvania, USA	Chair for water resources management track	[1]Track Chair (20 sessions)

8. <u>**Invited Lectures (Others than in Scholarly Conferences)**</u>

None

9. <u>**Colloquium Talks**</u>

Year	Name of Forum	Place of Lecture	Presentation
*2014	Department of Geography and Environmental Studies,	University of Haifa, Israel	Optimal management of natural resources and environmental systems

*2014	Grand Water Research Institute (GWRI)	Technion, Israel	Management of interdependent infrastructure systems		

10. **Research Grants**

a. **Grants Awarded**

Role in Research	Other Researchers (Name & Role)	Title	Funded by (C= Competitive Fund)	Amount	Years
*PI	Co-PI: Anna Book CIs: Avi Shaviv Andrea Ghermandi David Katz	An integrated modeling framework for real-time irrigation scheduling: the benefit of imaging spectroscopy and weather forecasts	Water Authority (C)	366,390 NIS	2014-2017
*PI		Development of multi-sensor system for hydraulic and contamination events detection	USAID (C)	$12,190	2015-2016
*PI	Co-PI: Ofira Ayalon	Cyber-Security of Water Distribution Systems: Attacks' Detection Algorithms	The center of cyber law and policy	40,000 NIS	2017-2019
*PI		Disaster Resilient Urban Water Systems: measures and tools	Water Authority (C)	353,000 NIS	2019-2022
*PI	Co-PI: Uri Shamir	Advanced methods for online control of water	Water Authority (C)	320,000 NIS	2019-2020

Role in Research	Other Researchers (Name & Role)	Title	Funded by		Years
*PI		distribution systems			
*PI	Co-PI: Ofira Ayalon	Policy Implications of Cyber-Security in Water Distribution Systems	The center of cyber law and policy	40,000 NIS	2019

b. Submission of Research Proposals – Pending

Role in Research	Other Researchers (Name & Role)	Title	Funded by (C= Competitive Fund)	Years

c. Submission of Research Proposals – Not Funded

Role in Research	Other Researchers (Name & Role)	Title	Funded by (C= Competitive Fund)	Years
*PI		Multi-station analysis for detecting water contamination in water supply systems	Water Authority (C)	2014-2017
*Co-PI	PI: Andrea Ghermandi	An agent-based hydro-economic modeling approach for sustainable water management through NF desalination in the Arava Valley	Ministry of Agriculture (C)	2014-2017
*PI		SWAT in the Cloud: an Automatic Calibration Framework for the Soil, Water Assessment Tool (SWAT) on Amazon Elastic Compute Cloud	GIF (C)	2014-2017
*PI		Optimization of regional water	ISF (C)	2017-2021

		supply systems under uncertainty	Judged as very good	
*PI	Co-PIs: Georgakakos Konstantine Biggs Trent Rimmer Alon, Reichmann Oren	The Value of Seasonal Hydrologic Forecasts for the Management of Lake Kinneret	BSF (C)	2017-2021
*PI	Co-PI: Gideon Gal	Use of a spatial-temporal dynamic ecological model to evaluate the impact of knowledge gaps on gas exploration and production policy: biological responses to light pollution as a case study	Ministry of Energy (C)	2018-2021

11. **Scholarships, Awards and Prizes**

- Excellence in teaching award (Technion)…………………………..2011
- Outstanding Reviewer for the Journal of Water Resources P&M….2012
- *Maof scholarship for young academic researchers………........2013-2016
- *Excellence in Refereeing award for Water Resources Research……2015
- *First place award in the Battle of Cyber-Attacks Detection Algorithms organized by EWRI-ASCE……………………………………........2017
- Outstanding Reviewer for the Journal of Water Resources P&M….2018

12. **Teaching**

a. **Courses Taught in Recent Years**

Years	Name of Course	Type of Course Lecture/Seminar/ Workshop/ Online Course/ Introduction Course (Mandatory)	Level	Number of Students
2007-2011	Introduction to Numerical Methods (TA)	Introduction Course (Mandatory)	B.Sc.	20

2007-2011	Water Waves Mechanics (TA)	Lecture	M.Sc.	20
2007-2011	Drainage Engineering (TA)	Lecture	M.Sc.	20
2011-2013	Environmental Systems (partly)	Lecture	B.Sc.	40
2011-2013	River Basin Management (partly)	Lecture	M.Sc.	20
*2013-Present	Environmental project management and green entrepreneurship	Lecture	M.A.	15
*2013-Present	Application of Matlab for environmental studies	Lecture	M.A.	15
*2013-Present	Statistics	Lecture	M.A.	15
*2014-Present	Environmental Systems Analysis	Lecture	M.A.	15
*2014-Present	Fluid Mechanics and Hydraulics	Lecture	B.Sc.	50
*2017-Present	Surface Hydrology	Lecture	B.Sc.	50
*2017-Present	Green Entrepreneurship	Lecture	M.A.	15
*2017-Present	Introduction to Economics	Lecture	M.A.	20
*2017-Present	Quantitative Methods	Lecture	M.A.	20
*2017-Present	Advanced Quantitative Methods	Lecture	M.A.	20
*2017-Present	Research Methods	Lecture	M.A.	20

b. **Supervision of Graduate Students**

Name of Student /	Name of Other Mentors	Title of Thesis	Degree	Year of Completion / In Progress	Students' Achievements
M.A. Students					

*Mariam Egbariah	co-supervisor: Uri Shamir, Technion	Optimal regional management of reclaimed water system with different qualities	M.A.	2017	• Presentation in international conference • Presentation in local conference
*Naama Shapira	co-supervisor: Lea Kronovater, Peak-Dynamics	Developing a negotiation support system for environmental-Economics conflicts resolution	M.A.	2017	• Presentation in international conference • Paper 1 submitted
*Tal Silver	co-supervisor: Gideon Gal, Kinneret Limnological Laboratory	Developing space-time dynamic model for analyzing lake Kinneret fishery	M.A.	2017	• Presentation in local conference
*Alaa Jamal	co-supervisor: Raphael Linker, Technion	Optimal irrigation scheduling incorporating probabilistic weather forecasts	M.A.	2017	• Two Journal papers published • Presentation in international conference
*Merav Tal-maon	co-supervisor: Dani Broitman, Technion	Quantifying the Interdependency, Resiliency, Reliability and Vulnerability of Interdependent Systems	M.A.	2019	
*Noy Kadosh	co-supervisor: Alex Frid	Detecting Cyber-attacks in water distribution systems	M.A.	2019	• One Journal papers submitted
*Tomer Aharon		Management of water supply systems under uncertainty: an info-gap approach	M.A.	In Progress	
Ph.D. Students					
* Elad Salomons		Practical Methods for WDSs operation	Ph.D.	In Progress	• One Journal paper submitted

PUBLICATIONS

Note:
For joint publications the order of the listed authors is according to their relative contribution (unless otherwise specified).

Index:
IF=Impact Factor
R= Rank
Q=Quartile
SJR=SCImago Journal Rank Indicator
V=Included in VATAT list of journals (The Council for Higher Education list)
#=Student
$=Research Assistant

A. Ph.D. Dissertation

Title: Optimal Multi-year Management of Regional Water Resources Systems under Uncertainty
Date of submission: August, 15th, 2011
Number of pages: 215
Language: English
Name of supervisor: Prof. Avi Ostfeld and Prof. Uri Shamir
University: Technion
Publications: D1-3, D5-6.

B. Scientific Books (Refereed)

None

C. Monographs

None

D. Articles in Refereed Journals

Published

1. **Housh, M.**, Ostfeld A., and Shamir U., (2011), Optimal multiyear management of a water supply system under uncertainty: Robust counterpart approach, Water Resources Research, 47(10), 1-15.

   IF 2011= 2.957
   R 2011= Limnology: 2/19; Water Resources: 3/78 (Q1)
   V

2. **Housh, M.**, Ostfeld, A., & Shamir, U. (2012). Box-constrained optimization methodology and its application for a water supply system model. Journal of Water Resources Planning and Management, 138(6), 651-659.

   IF 2012 = 1.709
   R 2012= Engineering, Civil: 19/122 (Q1)
   V

3. **Housh, M.**, Ostfeld, A., & Shamir, U. (2012). Seasonal multi-year optimal management of quantities and salinities in regional water supply systems. Environmental modelling & software, 37, 55-67.

   IF 2012= 3.476
   R 2012= Computer Science, Interdisciplinary Applications:
   8/100 (Q1)
   V

4. Perelman, L., Arad, J., **Housh, M.**, & Ostfeld, A. (2012). Event detection in water distribution systems from multivariate water quality time series. Environmental science & technology, 46(15), 8212-8219.

   IF 2012= 5.257
   R 2012= Engineering, Environmental: 2/42 (Q1)
   V

5. **Housh, M.**, Ostfeld, A., & Shamir, U. (2012). Implicit mean-variance approach for optimal management of a water supply system under uncertainty. Journal of Water Resources Planning and Management, 139(6), 634-643.

   IF 2013= 1.760
   R 2013= Engineering, Civil: 21/124 (Q1)
   V

6. **Housh, M.**, Ostfeld, A., & Shamir, U. (2013). Limited multi-stage stochastic programming for managing water supply systems. Environmental modelling & software, 41, 53-64.

   IF 2013= 4.538
   R 2013= Computer Science, Interdisciplinary Applications:
   5/102 (Q1)
   V

7. Perelman, L., **Housh, M.**, & Ostfeld, A. (2013). Least-cost design of water distribution systems under demand uncertainty: the robust counterpart approach. Journal of Hydroinformatics, 15(3), 737-750.

   IF 2013= 1.336
   R 2013= Engineering, Civil: 21/124 (Q1)
   V

8. Arad, J., **Housh, M.**, Perelman, L., & Ostfeld, A. (2013). A dynamic thresholds scheme for contaminant event detection in water distribution systems. Water research, 47(5), 1899-1908.

   IF 2013= 5.323
   R 2013= Water Resources: 1/81 (Q1)
   V

9. *Perelman, L., **Housh, M.**, & Ostfeld, A. (2013). Robust optimization for water distribution systems least cost design. Water Resources Research, 49(10), 6795-6809.

IF 2013= 3.709
R 2013= Limnology: 1/20 (Q1); Water Resources: 3/81 (Q1)
V

10. ***Housh, M.**, Cai X., Ng T., McIsaac G., Ouyang Y., Khanna M., Sivapalan M., Jain A., Eckhoff S., Gasteyer S., Al-Qadi I., Bai Y., Yaeger M., Ma S., Song Y., (2014), System of Systems Model for Analysis of Biofuel Development, Journal of Infrastructure Systems,10.1061/(ASCE)IS.1943-555X.0000238. (12 pages)

IF 2014= 1.049
R 2014= Engineering, Civil: 55/125 (Q2)
V

11. *Yaeger, M.A., **Housh, M.**, Cai, X., & Sivapalan, M. (2014). An integrated modeling framework for exploring flow regime and water quality changes with increasing biofuel crop production in the US Corn Belt, Water Resources Research, 50 (12), 9385–9404.

IF 2014= 3.549
R 2014= Limnology: 2/20 (Q1); Water Resources: 3/83 (Q1)
V

12. *Pan, L., **Housh, M.**, Liu, P., Cai, X., & Chen, X. (2015). Robust stochastic optimization for reservoir operation. Water Resources Research, 51(1), 409-429.

IF 2015= 3.792
R 2015= Limnology: 1/20 (Q1); Water Resources: 5/85 (Q1)
V

13. ***Housh, M.**, & Cai, X. (2015). Successive smoothing algorithm for solving large-scale optimization models with fixed cost. Annals of Operations Research, 229(1), 475-500.

IF 2015= 1.406
R 2015= Operations Research /Management Science: 32/82 (Q2)
V

14. ***Housh, M.**, & Ostfeld, A. (2015). An integrated logit model for contamination event detection in water distribution systems. Water research, 75, 210-223.

IF 2015= 5.991
R 2015= Water Resources: 1/85 (Q1)
V

15. ***Housh, M.**, Khanna, M., & Cai, X. (2015). Mix of first-and second-generation biofuels to meet multiple environmental objectives: Implications for policy at a watershed scale. Water Economics and Policy, 1(3), 1-26.

N/A

16. ***Housh M.**, Yaeger M., Cai X., Khanna M., McIsaac G., Sivapalan M., Ouyang Y., Jain, A., (2015), Managing Multiple Mandates: A System of Systems Model to Analyze Strategies for Producing Cellulosic Ethanol and Reducing Riverine Nitrate Loads in the Upper Mississippi River Basin, Environmental Science and Technology, 49 (19), 11932–11940.

> **IF 2015= 5.393**
> **R 2015= Engineering, Environmental: 3/50 (Q1)**
> **V**

17. *Schwartz, R., **Housh, M.**, & Ostfeld, A. (2016). Least-Cost Robust Design Optimization of Water Distribution Systems under Multiple Loading. Journal of Water Resources Planning and Management, 142(9), 1-11.

> **IF 2016= 3.537**
> **R 2016= Water Resources: 5/88 (Q1)**
> **V**

18. Nguyen, T. D., Cai, X., Ouyang, Y., & **Housh, M.** (2016). Modelling infrastructure interdependencies, resiliency and sustainability. International Journal of Critical Infrastructures, 12(1-2), 4-36.

> **IF 2016= N/A**
> **SJR 2016= 0.373**
> **R 2016= Safety, Risk, Reliability and Quality: 70/344 (Q2)**

19. *Schwartz, R., **Housh, M.**, & Ostfeld, A. (2016). Limited multistage stochastic programming for water distribution systems optimal operation. Journal of Water Resources Planning and Management, 142(10), 1-6.

> **IF 2016= 3.537**
> **R 2016= Water Resources: 5/88 (Q1)**
> **V**

20. ***Housh, M.**, [$]Ohar, Z. (2017). Integrating Physically based Simulators with Event Detection Systems: Multi-Site Detection Approach. Water Research, 110, 180-191.

> **IF 2016= 6.942**
> **R 2016= Water Resources: 1/88 (Q1)**
> **V**

21. ***Housh, M.**, [$]Ohar, Z. (2017). Multiobjective Calibration of Event-Detection Systems. Journal of Water Resources Planning and Management Division, 143(8), 1-5.

> **IF 2016= 3.537**
> **R 2016= Water Resources: 5/88 (Q1)**
> **V**

22. ***Housh, M.** (2017). Non-probabilistic robust optimization approach for flood control system design. Environmental Modelling & Software, 95, 48-60.

IF 2016= 4.404
R 2016= Computer Science, Interdisciplinary Applications:
6/105 (Q1)
V

23. *Givati A., **Housh M.**, Levi Y., Paz D., Carmona I., Becker E., (2017), The advantage of using international multi-model ensemble for seasonal precipitation forecast in Israel, Advances in Meteorology, (11 pages) https://doi.org/10.1155/2017/9204081

    IF 2016: 1.277
    R 2016= Geosciences: 280/408 (Q3)
    V

24. * Shafiee-Jood, M., **Housh, M.**, & Cai, X. (2018). Hierarchical Decision-Modeling Framework to Meet Environmental Objectives in Biofuel Development. Journal of Water Resources Planning and Management, 144(7), 1-15.

    IF 2016= 3.537
    R 2016= Water Resources: 5/88 (Q1)
    V

25. *# Jamal, A., Linker, R., & **Housh, M.** (2018). Comparison of Various Stochastic Approaches for Irrigation Scheduling Using Seasonal Climate Forecasts. Journal of Water Resources Planning and Management, 144(7), 1-10.

    IF 2016= 3.537
    R 2016= Water Resources: 5/88 (Q1)
    V

26. ***Housh, M.**, $Ohar, Z. (2018). Model-based approach for Cyber-Physical Attacks Detection in Water Distribution Systems. Water Research, 139, 132-143.

    IF 2016= 6.942
    R 2016= Water Resources: 1/88 (Q1)
    V

27. *Taormina, R., et al., **Housh, M.**, $Ohar, Z., (31 co-authors) (2018). The battle of the attack detection algorithms: disclosing cyber-attacks on water distribution networks. Journal of Water Resources Planning and Management Division, 144(8), 1-11.
    IF 2016= 3.537
    R 2016= Water Resources: 5/88 (Q1)
    V

28. *#Alaa J., Linker R., **Housh M.**, (2018). Optimal irrigation with perfect weekly forecasts vs. imperfect seasonal forecasts, Journal of Water Resources Planning and Management Division. (accepted)

    IF 2016= 3.537
    R 2016= Water Resources: 5/88 (Q1)
    V

29. ***Housh M.**, $Salomons E., (2018). Optimal dynamic pump triggers for cost saving and robust water distribution system operations, Journal of Water Resources Planning and Management Division. (accepted)

IF 2016= 3.537
R 2016= Water Resources: 5/88 (Q1)
V

30. *Sela L., **Housh M.**, (2018). Increasing the usability of water distribution analysis tools through plugins development in EPANET, Journal of Hydraulic Engineering. (accepted)
   IF 2016= 2.183
   R 2016= Civil Engineering: 29/125 (Q1)
   V

E. <u>Articles or Chapters in Scientific Books (Refereed)</u>
None

F. <u>Articles in Conference Proceedings</u>
<u>Published</u>

1. **Housh M.**, Ostfeld A., and Shamir U., (2011), Multi-year optimal management of quantities and salinities in water supply systems, Bearing Knowledge for Sustainability - Proceedings of the 2011 World Environmental and Water Resources Congress, Palm Springs, California, USA, pp. 4267-4277.

2. **Housh M.**, Ostfeld A., and Shamir U., (2011), Optimal multi-year management of a water supply system under uncertainty: Robust counterpart approach, Bearing Knowledge for Sustainability - Proceedings of the 2011 World Environmental and Water Resources Congress, Palm Springs, California, USA, pp. 3075-3085.

3. **Housh M.**, Ostfeld A., and Shamir U., (2011), Search method for box-constrained optimization, Bearing Knowledge for Sustainability - Proceedings of the 2011 World Environmental and Water Resources Congress, Palm Springs, California, USA, pp. 2901-2910.

4. **Housh M.**, Ostfeld A., and Shamir U., (2011), Optimal multi-year operation of a water supply system under uncertainty: robust methods. Risk in Water Resources Management - Proceedings of Symposium H03 held during IUGG2011in Melbourne, Australia, July 2011. IAHS Publ. 347, 2011, pp. 183-190.

5. **Housh M.**, Ostfeld A., and Shamir, U., (2012),Optimal multi-year management of a regional water supply system under uncertainty: the affine adjustable robust counterpart approach, Crossing Boundaries - Proceedings of the 2012 World Environmental and Water Resources Congress, Albuquerque, New Mexico, USA, pp. 793-807.

6. Arad J., **Housh M.**, Perelman L., and Ostfeld A., (2012), Contamination event detection utilizing Genetic Algorithm, Proceedings of the 14th Water Distribution Systems Analysis Conference, Adelaide, South Australia.

7. Perelman L., **Housh M.**, Oliker N., and Ostfeld A., (2012), Non-probabilistic approach for the optimal design of water distribution systems under demand

uncertainty, Proceedings of the 14th Water Distribution Systems Analysis Conference, Adelaide, South Australia.

8. Arad J., **Housh M.**, Perelman L., and Ostfeld A., (2012), Comparison between Fixed thresholds and Genetic algorithm methods for water quality event detection, Proceedings of the 14th Water Distribution Systems Analysis Conference, Adelaide, South Australia.

9. *Perelman L., **Housh M.**, and Ostfeld A., (2013), Explicit Demand Uncertainty Formulation for Robust Design of Water Distribution Systems, Showcasing the future - Proceedings of the 2013 World Environmental and Water Resources Congress, Cincinnati, Ohio, USA, pp. 684-695.

10. *Fagiolini, A., **Housh M.**, Ostfeld, A., and Bicchi, A., (2014), Distributed Estimation and Control of Water Distribution Networks by Logical consensus", International Symposium on Communications, Control, and Signal Processing: Special Session on Wireless Sensor and Actuator Network Applications, Athens, Greece.

11. ***Housh M.**, Ostfeld A., and Shamir U., (2014), Management of Water Systems under Hydrological Uncertainty, Proceedings of the Dooge Nash International Symposium, 23-26 April 2014, Dublin, Ireland, pp. 355-364.

12. ***Housh M.**, and Ostfeld A., (2015), Utilizing discrete choice models for fusing alarms from multiple water quality indicators, Proceedings of the 2015 World Environmental and Water Resources Congress, Austin, Texas, USA, pp. 652-657

13. ***Housh M.**, $Ohar Z., (2017), Model based approach for Cyber-Physical Attacks Detection in Water Distribution Systems, Proceedings of the 2017 World Environmental and Water Resources Congress, Sacramento, CA, USA, pp. 727-736

G. **Entries in Encyclopedias**

None

H. **Other Scientific Publications**

None

I. **Other Works and Publications**

None

J. **Submitted Publications**

Articles under review

1. *#Shapira, N., **Housh M.**, (2018), A Modified Multi-Objective Game-Theory Model for Environmental-Economic Conflicts, Environmental Science and Pollution Research. (~ 7 pages)

   IF 2015: 2.76
   R 2015= Environmental Sciences: 65/225 (Q2)

2. * Sela, L., #Salomons, E., **Housh, M.**, (2018), A plugin framework for EPANET software, Environmental Modeling and Software. (~8 pages)

   IF 2016= 4.404
   R 2016= Computer Science, Interdisciplinary Applications: 6/105 (Q1)
   V

K.   Summary of my Activities and Future Plans

Summary of my Activities

Many contemporary water and environmental challenges require uncertainty analysis of large-scale, complex systems. I study how to model complex systems incorporating environmental, economic and sustainability aspects while focusing on how to guide the design and management of such systems to address uncertainty and extreme events. I also study the design and the management of "smart" infrastructure systems (so-called cyber-infrastructure systems) where I use mathematical modeling and uncertainty analysis to best utilize automated sensing technologies and the vast computational capacity provided by cloud computing technology to design "smarter" infrastructure systems in general and water infrastructure systems in particular. My publications cover modeling methodologies and their implementation to water resources and environmental systems, to support sustainable policies, in conjunction with derivation and methodological developments in the field of optimization of large and complex systems and optimization under uncertainty.

Future Research Plans

The following sections detail my plans for research and the initiatives already taken in these directions, since I joined the University of Haifa in October 2013. My future research will focus on three themes: (a) Water, Energy and Food Nexus, combining several subthemes; (b) "Smart" water infrastructure; (c) Game-theoretic approaches for deriving institutionally feasible models.

Theme 1: Water, Energy and Food Nexus

Water, energy and food are inextricably interlinked, and this ensemble is currently referred to jointly as the water-energy-food nexus. In fact, to address this joint domain it is necessary to combine several inter-related topics. The following paragraphs explain some of my future research directions in this topic, and in each case indicate what I have already accomplished.

Biofuel Production

Biofuel Production will have a substantial impact on the water-energy-food nexus. Agricultural land limitation increases food prices as well as environmental impacts on water quantity and quality of the biofuel development and have yet to be fully understood. The model developed in my post-doctoral research is considered a first

step toward a holistic perspective for analyzing the impacts of biofuel development on interdependent infrastructure and environmental systems.

Currently, while at Haifa University we addressed the biofuel system by developing a framework that is able to simulate a fine temporal resolution of hydrological impacts of the biofuel development. We also addressed GHG emissions and water pollution impacts of the biofuel development through a modeling framework.

Precision Agriculture

Precision Agriculture is a promising concept for addressing the water-food nexus. Through integration of remote sensing technology and optimization models, agriculture systems could maximize returns on inputs while preserving resources.

I led a proposal on this topic and it was approved by the Israeli Water Authority in December 2014. In this study, we suggested improving irrigation decisions through integration of: (a) probabilistic weather prediction and stochastic optimization, (b) remote sensing of soil moisture, and (c) physically based crop simulation models. One of my students, Mr. Alaa Jamal studied this topic for his MSc degree, co-supervised with Professor Raphael Linker.

Water Distribution Systems

Water Distribution Systems (WDS) use a significant part of a country's energy consumption and thus contribute to the water-energy nexus. Energy costs of WDSs could be reduced by optimizing pumps scheduling in the system. An active research area is focused on developing simulation and optimization models to optimize the operation of WDSs. I intend to build on my expertise in optimization under uncertainty to explicitly consider various uncertain aspects of the operation problems such as the uncertain demand and the uncertain characteristic for WDS.

For this purpose, with my research assistant, Mr. Ziv Ohar, we are developing a new formulation for simulating water distribution system problems which is based on Differential Algebraic Equations (DAE). Our results to date already indicate that the DAE formulation is able to simulate water distribution systems with negligible errors, as compared with traditional methods but with orders-of-magnitude less computational time. This DAE formulation is a new way of thinking of water distribution system and I hope that it will constitute a paradigm shift in the field of water distribution system analysis.

Desalination and Treatment Plants

Desalination plants are another component of the water-energy nexus. My future research will investigate the broad impacts of desalination plants including: environmental and socio-economic impacts and interdependency and reliability of infrastructure systems related to desalination and treatment plants (e.g. electrical network, water distribution systems, etc.) as well as process optimizations in the treatment plants.

One of my students, Mrs. Mariam Egbariah, co-supervised with Professor Uri Shamir, conducted her master degree research on this topic.

Theme 2: Smart Water Infrastructures

The advancement and availability of sensor technology for water infrastructure systems have increased significantly in recent years. For example, it is my belief that Automatic Meter Reading (AMR) has a significant advantage for efficient operation and monitoring of water distribution systems. Still, AMR are generally used in practice only for billing purposes. A topic I plan to investigate is development of

monitoring frameworks and optimization models for water distribution system that integrate AMR data. I am currently collaborating with Dr. Adriano Fagiolini (Università degli Studi di Palermo, Italy) on this topic. In addition, the availability of low-cost water quality sensors will facilitate the use of multi-site contamination Event Detection Systems (EDS). This multi-site EDS will replace the currently available but the potentially unreliable single-site EDS. I have recently published three publications in this topic.

Theme 3: Game-theoretic approach for institutionally feasible water management modeling

Optimization models help in deciding on the optimal management of the system incorporating environmental, economic and sustainability aspects. Still, classical optimization models often assume a decision maker who can implement the optimal solution exactly as suggested by the model. This can result in institutionally unrealistic/infeasible solution in real-life, because there are many agencies and stakeholders involved. One of my future research directions will address this challenge by adapting, for example, the game theoretic approach to model the interactions between the actors involved in the system.

One of my graduate students, Mrs. Naama Shapira, conducted her master degree research on this topic, co-supervised with Dr. Lea Kronaveter-Goldstein.