

RESUME

December 2023

1. PERSONAL DETAILS

Full Name: Eran Arad

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ORCID iD: 0000-0001-9320-2274

2. ACADEMIC DEGREES

1994 Ph.D. in Aerospace Engineering, Technion, Israel Institute of Technology
Advisor : Prof M Wolfshtein

1982 B.Sc. (cum Laude) in Aeronautical Engineering, Technion, Israel Institute of Technology

3. ACADEMIC APPOINTMENTS

Oct 2022-Now Associate Research Fellow in Mechanical Engineering, Technion

1994-1996 Associate Research Fellow in Mechanical and Aerospace Engineering,
Princeton University, NJ

4. PROFESSIONAL EXPERIENCE (outside academia)

2018-2022 Research Fellow, RAFAEL, Advanced Defense Systems, Israel

2016-2018 Senior Research Associate, RAFAEL, Advanced Defense Systems, Israel

2011-2018 CFD Technical Leader, RAFAEL, Advanced Defense Systems, Israel

2001-2018 Head, CFD group, Aeronautical Systems, RAFAEL, Advanced Defense Systems,
Israel

2007-2016 Rafael representative at Thermal and Fluid Sciences Affiliates Program,
Mechanical Engineering, Stanford University, CA

2006-2016 PI (Principal Investigator) for the Israeli team in collaborative basic rotorcraft
research between IMOD and US Army

1997-2001 Senior research engineer in CFD group, Aeronautical Systems, RAFAEL, Israel
Ministry of Defense

1985-1994 Research engineer in CFD group, Aeronautical Systems, RAFAEL, Israel Ministry
of Defense

1981-1985 Research engineer in Applied Mathematics Department, Computer Center,
RAFAEL, Israel Ministry of Defense

1979-1981 Research Assistant (student) at the Faculty of Aeronautical Engineering, Technion,
Israel Institute of Technology

5. RESEARCH INTERESTS (briefly)

Numerical simulation of flow, turbulence simulation including Large-Eddy-Simulation and RANS models. Multi-physics simulations: flow-chemistry coupling in compressible-turbulent-combustion, hypersonic flow simulations (including SCRAM propulsion), flow-optics coupling in analysis of flow-induced optical aberrations and light-induced flow in micro-systems. Flow-acoustic coupling in aerodynamics and jet induced noise analysis. Application and development of numerical methods in PDE. High-performance-parallel-computing including usage of GPU and similar accelerators. Quantum computing, hybrid AI and CFD approaches.

6. TEACHING EXPERIENCE

winter 2022-2023: Numerical methods for ODE and PDE (Numerical Methods in Mech Eng 1), teacher in-charge, undergraduate level

7. PUBLIC PROFESSIONAL ACTIVITIES

Reviewer for archived journals: Physics of Fluids (2023, 2021,2020,2017), Aerospace Science and Technology (2023,2019, 2017), AIAA J (2018,2017), International J of Heat and Fluid Flow (2019), IACASE conference (2021, 2019, 2017), PAZI fund (2022)

Scientific/Technical board membership: 2018-now: Board member of SU2 Foundation: Open-source Multi-physics Simulation

8. FELLOWSHIPS, AWARDS AND HONORS

2014 Rafael annual Prize: Eliezer Gon prize for outstanding researcher
1990 Ben-Amitay Award for outstanding research in Aeronautics

9. GRADUATE STUDENTS

Completed PhD theses

Mickey Weidenfeld, 2018, “Approaches for the Monitoring of Airfoil Aerodynamic Noise”, Aero. Eng, Technion, Supervisors: Asst Prof A Manela and Dr E Arad. Current employment: Elbit, Head of CFD group

Yuval Dagan, 2016, “Numerical Investigation of Flame Structure and Stability in Gaseous and Liquid Fuel Turbulent Combustion”, Aero. Eng, Technion, Supervisors: Prof Y Tambour and Dr E Arad, Current employment: Asst. Prof, Aero. Eng, Technion

Completed MSc theses

Amir Mittelman, 2019, “Aft-Sting Mount Effects on Missile Longitudinal Stability and Base Flow Characteristics”, Aero. Eng, Technion, Supervisors: Prof J Cohen and Dr E Arad. Current employment: PhD student at the University of Queensland, Australia

Irena Rudin, 2018, “Performance Improvement of Boundary Layer Ingesting Inlets Using Active Flow Control Techniques: Computational Analysis”, Aero. Eng, Technion, Supervisors: Prof J Cohen and Dr E Arad . Current employment: Technical Leader, Aeronautical Systems, Rafael

Moran Bercovici, 2006, “Evolution of forebody vortices over slender bodies at high angles of attack”, Aero. Eng, Technion, Supervisors: Prof G Iosilevskii and Dr E Arad. Current employment: Prof at Mech. Eng., Technion

9. SPONSORED LONG-TERM VISITORS AND POST-DOCTORAL ASSOCIATES

1994-1995 Associate Research Fellow in Mechanical and Aerospace Engineering,
Princeton University, NJ

10. RESEARCH GRANTS

Industrial and other sources

2023, Rafael-Academia Research Grant

11. PUBLICATIONS

Theses

Arad E, "Two-Scale Turbulence Model for Wall Bounded Flow", Ph.D. thesis, Aerospace Engineering, Technion, Haifa, Israel, 1994. Advisor: Prof. M Wolfshtein

Refereed papers in professional journals

Published papers

1. **Arad E.**, Berger M., Israeli M. and Wolfshtein M., "Numerical Calculation of Transitional Boundary Layers", Int. J. of Numerical Methods in Fluids, Vol. 2, pp.1-23, 1982
2. **Arad E.** and Wolfshtein M., "Gradient Boundary Conditions for Turbulent Flows", Computational Fluid Dynamics, G. de Vahl Davis and C. Fletcher (Editors), Elsevier Science Publishers B.V. (North-Holland),1988, pp.205-216
3. Igra D. and **Arad E.**, "A Parametric Study of The Busemann Biplane Phenomena", Shock Wave J., Springer, Vol 16., No 3, pp 269-273, February 2007
4. Ben-Hamou E., **Arad E.** and Seifert A., "Generic Transport Aft-Body Drag Reduction using Active Flow Control", Flow, Turbulence and Combustion J., Vol. 78, No. 3-4, pp365-382, Springer, June 2007
5. Igra D. and **Arad E.**, "A Parametric study of an Axisymmetric Busemann Biplane Configuration", AIAA J. of Aircraft, Vol. 46, No. 6, pp1930-1937, 2009
6. Wilson J, Schatzman D, **Arad E**, Seifert A and Shtendel T, "Suction and Pulsed-Blowing Flow Control Applied to an Axisymmetric Body", AIAA Journal, Vol 51, No 10 (2013),pp 2432-2446. DOI: 10.2514/1.J052333
7. Dagan Y and **Arad E**, "Analysis of Shroud Release Applied for High Velocity Missiles", AIAA J of Spacecraft and Rockets(2014), Vol 51, No 1, pp57-65
8. **Arad E**, Ramasamy M and Wilson J, "Flow Response of Active-Flow-Control Actuators", AIAA Journal (2014), Vol 52, No 5, pp 998-1009
9. Dagan Y, **Arad E** and Tambour Y, "On the Dynamics of Spray Flames in Turbulent Flows", Proc. Combust. Inst. 35(2) pp1665-1667, (2015)
10. Schatzman D, Wilson J, **Arad E**, Seifert A and Shtendel T, "Drag-Reduction Mechanisms of Suction-and-Oscillatory-Blowing Flow Control", AIAA J, vol 52, issue 121, pp2491-2505 (2014)
11. Dagan Y, **Arad E** and Tambour Y, "The evolution of local instability regions in turbulent non-premixed flames", J. Fluid Mech. (2016), vol. 803, pp. 18–50

12. Weidenfeld M and **Arad E**, "Mitigating the sound of a flapping airfoil using optimal structural properties distributions", J. Sound and Vibrations, Vol 432, No 13 (2018), pp 235-248

Chapters in books

1. **Arad E.** and Wolfshtein M., "Two-Scale Double-Layer Model in wall Bounded turbulent Flow", Selected Papers from the Ninth International Symposium on Turbulent Shear Flows (reviewed paper in a book), F. Durst, N. Kasagi, B. E. Launder, F. W. Schmidt, K. Suzuki and J. H. Whitlaw (Eds.), Springer-Verlag, 1995

Refereed papers in conference proceedings

1. **Arad E.**, Israeli M. and Wolfshtein M., "The Calculation of Transitional Boundary Layer by A Two Equation Turbulence Model", Proc. of the 8th Australian Aeronautics and Astronautics Conf, 1984
2. **Arad E.**, Gordon R. and Arieli R., "An Improved Technique for The Solution of Inviscid Transonic 3D Flows", Proc. of the 29th Israel Annual Conf. of Aviation and Astronautics, Israel, 1987
3. **Arad E.** and Wolfshtein M., "Efficient Numerical Simulation of Turbulent Flow", Proc. of The 16th Congress of The Int. Council of Aeronautical Sciences (ICAS), Jerusalem, 1988
4. **Arad E.** and Wolfshtein M., "A Comparative Study of Length Scale Equations in Turbulent Boundary Layers", Proc. of Turbulent Shear Flow 7, Stanford, CA, 1989
5. **Arad E.** and Wolfshtein M., "Study of A Two-scale Double-Layer Model in Wall Bounded Turbulent Flow", Proc. of Turbulent Shear Flow 8, Munich, Germany, 1991
6. **Arad E.** and Wolfshtein M., "Two-Scale Double-Layer Model in wall Bounded Turbulent Flow", Proc. of Turbulent Shear Flow 9, Kyoto, Japan, 1993
7. **Arad E.** and Martinelli L., "Large Eddy Simulation of Compressible Flow Using a Parallel, Multigrid Driven Algorithm", AIAA-96-2065, 27th AIAA Fluid Dynamics Conf, New Orleans, LA, 1996
8. **Arad E.** and Martinelli L., "Numerical Characteristics of A Multigrid Driven Algorithm for Large Eddy Simulation", Proc. of the 15th Int. Conf. on Numerical Methods in Fluid Dynamics, Monterey, CA, 1996
9. **Arad E.** and Martinelli L., "Application of A Parallel, Multigrid Algorithm for Large Eddy Simulation", Turbulence, Heat and Mass Transfer 2, Hanjalic H. and Peeters T. W. J (Eds.), Delft Univ. Press, The Netherlands, 1997
10. **Arad E.** and Martinelli L., "Assessment of An Implicit, Parallel, Multigrid Driven Algorithm for Large Eddy Simulations", Proc. of Turbulent Shear Flow 11, Grenoble, France, 1997
11. **Arad E.** and Wolfshtein M., "Large eddy Simulation of Equilibrium Boundary Layers", the 16th Int. Conf. on Numerical Methods in Fluid Dynamics, Arcachone, France, 1998
12. **Arad E.** and Wolfshtein M., "Analysis of Equilibrium Adverse Pressure Gradient Boundary Layers Using Large Eddy Simulation", AIAA-99-0420, 37th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, 1999
13. Bowen A. J., Koren S. and **Arad E.**, "Wind Tunnel and Numerical Modeling of Wind Flow over Parallel 2D Ridges", 10th Int. Conf. on Wind Engineering, Copenhagen, Denmark, 1999

14. **Arad E.**, "Analysis of Boundary Layer Separation over A Bump Using Large Eddy Simulation", AIAA-2001-2558, 15th AIAA Computational Fluid Dynamics Conf., Anaheim CA, 2001
15. Zarutski T., **Arad E.** and Arieli R., "Experimental and Computational Study on the Effect of Bumps on the Aerodynamics of Missile's Noses, 42nd Israeli Annual Conf. on Aerospace Sciences, Israel 2002
16. Igra D. and **Arad E.**, "A Parametric Study of The Busemann Biplane Phenomena", 43rd Israeli Annual Conf. on Aerospace Sciences, Israel 2003
17. Martin P.B, Tung C., Chandrasekhara M. S. and **Arad E.**, "Active Separation Control: Measurements and Computations for NACA0036 Airfoil", AIAA-2003-3516, 21st AIAA Applied Aerodynamics Conf., Orlando, FL, 2003
18. Ben Hamou E., **Arad E.** and Seifert A., "Generic Transport Aft-Body Drag Reduction using Active Flow Control", AIAA-2004-2509, AIAA Applied Aerodynamic Conf, Portland June 2004
19. **Arad E.** , Martin P. B., Wilson J. and Tung C., "Control of Massive Separation on A Thick-Airfoil Wing: A Computational and Experimental Study", AIAA-2006-0332, AIAA 44th Aerospace Sciences Meeting, Reno NV, 2006
20. Igra D. and **Arad E.**, "Numerical investigation of the induced force on a missile due to ACS jet", 46th Israeli Annual Conf. on Aerospace Sciences, Israel 2006
21. Bercovici M., **Arad E.**, Yehoshua T. and Seifert A., "On the computational Modeling of synthetic jet actuators", 46th Israeli Annual Conf. on Aerospace Sciences, Israel 2006
22. van der Weide E., Alonso J. J., **Arad E.** and Bercovici M., "Drag prediction for the DPW-3 test cases using SUmb", 3rd AIAA CFD Drag Prediction Workshop, San Francisco, CA, June 2006
23. Bercovici M., **Arad E.** and Iosilevskii G., "Evolution of forebody vortices over slender bodies at high angles of attack", 48th Israeli Annual Conf. on Aerospace Sciences, Israel 2008
24. Igra D. and **Arad E.**, "A parametric study of an axisymmetric Busemann biplane configuration", AIAA-2008-3726, AIAA 38th Fluid Dynamics Conference and Exhibit, Seattle, June 2008
25. **Arad E.**, Sperber D. and Seifert A., "Computational and Experimental Study of Circular Cylinder Flow Control", AIAA-2008-4379, AIAA 38th Fluid Dynamics Conference and Exhibit, Seattle, June 2008
26. Dagan Y., **Arad E.** and Tambour Y., "Flame Propagation Analysis in Turbulent Combustion Using Large Eddy Simulation", 50th Israeli Annual Conf. on Aerospace Sciences, Israel 2010
27. Dagan Y., **Arad E.** and Tambour Y., "Some Observations on Flame Propagation in Turbulent Combustion", AIAA 2011-780, 49th AIAA Aerospace Sciences Meeting, January 2011, Orlando, Florida
28. J. Wilson, D. Schatzman, **E. Arad**, T. Shtendel and A. Seifert, "Active Separation Control Applied to an Axis-symmetric Body", AIAA 2012-0072, 50th AIAA Aerospace Sciences Meeting, January 2012, Nashville, TN
29. Dagan Y. and **Arad E.**, "A Novel Approach for Design of In-flight Nose Release for a High Velocity Missile", AIAA 2012-0674, 50th AIAA Aerospace Sciences Meeting, January 2012, Nashville, TN

30. **E Arad**, M Ramasamy and J. Wilson, “Towards More Accurate Analysis Of Active Flow Control Actuators”, AIAA 2012-1250, 50th AIAA Aerospace Sciences Meeting, January 2012, Nashville, TN
31. Schatzman D, Wilson J, **Arad E**, Seifert A and Shtendel T, “Flow Physics of Drag Reduction Mechanism using Suction and Pulsed Blowing”, AIAA-2013-0488, 51st AIAA Aerospace Sciences Meeting, January 2013, Grapevine, Texas
32. Dagan Y, **Arad E** and Tambour Y, “On the Dynamics of Spray Flames in Turbulent Flows”, oral presentation at the 35th International Symposium on Combustion, San Francisco, CA, August 3-8, 2014
33. Schatzman D, Wilson J, Larom A, Paeli V and **Arad E**, Seifert A “Suction and Oscillatory Blowing Interaction with Boundary Layers”, AIAA-2015-0808, AIAA SciTech meeting, 2015
34. Weidenfeld M and **Arad E**, “An Approximate Method for Aero-Optical Computations Using Incompressible LES”, 56th IACAS conf, 2016
35. Wilson J, Schatzman D, Larom A, Paeli V, Seifert A and **Arad E**, “Experimental and Computational Characterization of SaOB Actuator Flow Control With Flat Plate Boundary Layers”, AIAA-2017-1691, AIAA SciTech meeting, 2017, Fort Worth, TX
36. **Arad E** and Weidenfeld M, “Aero-Optic Calculations of A Spherical Turret”, AIAA-2017-0537, AIAA SciTech meeting, 2017, Fort Worth, TX
37. Rudin I, **Arad E** and Cohen J, “Analysis and Performance Enhancement of Boundary Layer Ingesting Inlet”, 57th IACAS conf, 2017
38. Shitrit S and **Arad E**, “Hypersonic Flow Computations by Using an Equivalent Gas Model”, 31st Int Symp on Shock Waves, Nagoya 2017
39. Rudin I, **Arad E** and Cohen J, "Performance Enhancement of Boundary Layer Ingesting Inlet Using Active Flow Control Methods", AIAA-2018-3066, AIAA-Aviation Forum, 2018, Atlanta, GA
40. **Arad E**, Yokev N, Brod H E and Michaels D, "From Supersonic Combustion to Thermal Choking: Numerical and Experimental Analysis of A Scramjet Engine", AIAA-2020-2966, AIAA-Aviation Forum, 2020
41. **Arad E** and Michaels D, "Analysis of Air Vitiation and Contaminations Effects on Scramjet Ground Tests", AIAA-2021-4177, 24th International Space Planes and Hypersonic Systems and Technologies Conference, ASCEND 2021
42. **Arad E**, “Real Gas Modeling for Hypersonic Flight: Simplified and More Detailed Approaches”, WeL2T2.3, IACAS 62nd, March 202

Research reports and other publications

1. **E Arad**, “Turbulence Modeling”, Lecture Series, RAFAEL, Israel, 1998
2. Igra D. and **Arad E.**, “A parametric study of the Busemann biplane phenomena”, Presentation at Industry and Academy meeting on CFD at IAI, April 2004
3. **Arad E.**, “Drag reduction and Wake Manipulation by Active Separation Control”, Presentation at Industry and Academy meeting on CFD at IAI, April 2004
4. Dagan Y, **Arad E** and Tambour Y, “Computational Analysis of Flame Propagation in Gaseous and Liquid Fuel Turbulent Combustion”, Meeting on CFD in Defense Industry, MAFAT, Israel, 2013

5. **Arad E**, "Characterization of Active Flow Control Actuators: Inflow and Onset of Turbulence", Meeting on CFD in Defense Industry, MAFAT, Israel, 2013

12. CONFERENCES

Contributed Talks and Posters

1. **E. Arad**, "Turbulence Modeling", Department Seminar, Department of Mechanical and Aerospace Eng., Engineering Faculty, Princeton University, 1996, oral
2. **E. Arad**, "Assessment of an implicit , parallel, multigrid driven algorithm for large eddy simulation", Department Seminar, Department of Flow and Heat Transfer, Faculty of Engineering, Tel-Aviv Univ., Israel, 1997, oral
3. **E. Arad**, "Analysis of equilibrium adverse pressure gradient boundary layers by large eddy simulation", Department Seminar, Aerospace Eng., Stanford University, January 1999, oral
4. **E. Arad**, "Large eddy simulation for adverse pressure gradient boundary layers", Faculty Seminar, Aerospace Eng., Technion, Haifa, Israel, March 1999, oral
5. **Arad E.**, "Massive Flow Separation : A Challenging Task for Prediction and Flow Control Approaches", Presentation at 19th Israel Symposium on Computational Mechanics (ISCM-19), Tel Aviv, IL, October 2005, oral
6. **Arad E.**, "Flow Separation and Separation Control: Computational Analysis", Department Seminar, Aerospace Engineering Fac., Technion, April 2005, oral
7. **Arad E.**, " Computational Analysis of Oscillatory Blowing: Micro and Macro Scale view", Department Seminar, Engineering Fac., Tel Aviv University, December 2005, oral
8. **Arad E**, "Assessment of a Fluidic Oscillator Utilized for Active Flow Control", CTR Seminar, Mechanical Engineering, Stanford Univ, May 2014, oral
9. **Dagan Y, Arad E** and Tambour Y, "The Impact of Large Scale Flow Structures on Turbulent Spray Flames", 1st CFD Impact Conference, Technion 2015, oral
10. **Arad E**, "Simulation of Fluidic Oscillator As Applied for Flow Control", 1st CFD Impact Conference, Technion 2015, oral
11. **Arad E** and Weidenfeld M, "Aero-Optic Predictions of Transonic Flow Using Compressible Large Eddy Simulation", 2nd CFD Impact Conference, Technion 2016, oral

Participation in organizing conferences

1. SU2 1st Developers Meeting, Delft, The Netherlands, 2016, Conference co-organizer
2. SU2 2nd Developers Meeting, 2017 Stanford U, USA, Conference co-organizer
3. SU2 3rd Developers Meeting, Glasgo, UK, 2018, Conference co-organizer
4. SU2 4th Developers Meeting, Varenna Italy, 2019, Conference co-organizer
5. SU2 1st Conference, Virtual event, 2020, Conference co-organizer
6. SU2 2nd Conference, Virtual event, 2021, Conference co-organizer
7. SU2 3rd Conference, Varenna Italy, 2022, Conference co-organizer
8. SU2 4th Conference, Varenna Italy, 2023, Conference co-organizer