

Resume

DAN MICHAELS

Lecturer, Faculty of Aerospace Engineering

Head of the Aerothermodynamics Lab.

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ACADEMIC DEGREES:

PhD. 2014, Faculty of Aerospace Engineering, Technion, Haifa, Israel.

MA. 2009, Faculty of Aerospace Engineering, Technion, Haifa, Israel.

B.Sc. 2006, Summa Cum Laude. Faculty of Aerospace Engineering, Technion, Haifa, Israel.

ACADEMIC APPOINTMENTS:

Oct. 2016 – Present	Lecturer Faculty of Aerospace Engineering, Technion, Haifa, Israel
Jan. 2015 – Oct. 2016	Postdoctoral Fellow/Associate Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, USA
March 2013 – Jan. 2014	Teaching Assistant Faculty of Aerospace Engineering, Technion, Haifa, Israel

PROFESSIONAL EXPERIENCE

Jan. 2007 – Jan. 2015	Research Engineer Loads and Flutter Group, Israeli Air Force
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RESEARCH INTERESTS:

Research in the area of propulsion and combustion. Particular interests: Combustion Dynamics and Stability, Fuel Variability For Propulsion And Energy Production, Pulse Detonation Engines, Solid Propellants, Two-Phase Reacting Flows, Space Chemical Propulsion.

TEACHING EXPERIENCE:

1. Teaching Assitant at the Faculty of Aerospace Engineering, Technion, Haifa, Israel.
Course taught: Compressible Aerodynamics (Undergraduate), spring 2013 and winter 2013.
2. Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, USA. Guest lecture on “Numerical Combustion” in the course 2.28 “Fund. & App. Of Combustion” (Graduate), fall 2015.
3. Teaching Certificate from the Kaufman Teaching Certificate Program, MIT, summer 2015.
Received training in designing a course, constructing effective learning, effective problem sets and exam questions, interactive and active learning, and educational technology.
4. Lecturer at the Faculty of Aerospace Engineering, Technion, Haifa, Israel.
Course taught:

- Rocket and Jet Propulsion (Graduate), spring 2017.
- Fundamentals of supersonic Combustion (new joint undergraduate and graduate course), Winter 2017.

FELLOWSHIPS, AWARDS AND HONORS:

- 2015-2016 MIT-Technion post doctoral fellowship.
- 2014 Best Paper Award at the 10th International Symposium on Special Topics in Chemical Propulsion, Poitiers, France.
- 2014 Arie Hillel Prize for excellence in PhD studies in Aerospace Engineering.
- 2013 1st prize for the best poster presentation at the 27th Annual Symposium of the Israeli Section of the Combustion Institute.
- 2013 Yaakov Timnat Prize for presenting a paper in an international conference.
- 2010 Neevya Durban Prize in the 50th Israel annual Conference on Aerospace Sciences.
- 2009 Arie Hillel Prize for excellence in Masters studies in Aerospace Engineering.
- 2007 Acknowledgement in the Technion Technological Innovation Competition for B.Sc students (with partners).
- 2007 Uzi and Eliana Rubin prize for outstanding research work.
- 2002-2006 Technion President List every semester.

PUBLICATIONS

A. THESES

1. “Interior Ballistics of a Combustion Chamber Discharging a Concentrated mass,”
PhD. Thesis, Faculty of Aerospace Engineering, Technion – Israel Institute of Technology, Haifa, Israel, December 2014.

B. REFEREED PAPERS IN PROFESSIONAL JOURNALS

1. Michaels, D. and Gany, A., “Modeling of a Short Action Motor Discharging a Weight”, *International Journal of Energetic Materials and Chemical Propulsion*, Vol. 12, No. 4, 2013, pp. 275-306. (Impact factor 0.37¹)
2. Michaels, D., and Gany, A. “Theoretical and experimental study of a thruster discharging a weight.” *Acta Astronautica*, Vol. 99, 2014, pp. 252-262. (Impact factor 2.06¹)
3. Michaels, D. and Gany, A., “Investigation of a Thruster Based on a Traveling Propellant Charge”, *International Journal of Energetic Materials and Chemical Propulsion*, Vol. 14, No. 3, 2015, pp. 197-220. (Impact factor 0.37¹)
4. Michaels, D. and Ghoniem, A.F., “Impact of the bluff-body material on the flame leading edge structure and flame-flow interaction of premixed CH₄/Air flames”, *Combustion and Flame*, Vol. 172, 2016, pp. 62-78. (Impact factor 4.46¹)
5. Michaels, D. and Gany, A., “Modeling and Testing of a Tube-In-Tube Separation Mechanism for Bodies in Space”, 2016, *Acta Astronautica*, Vol. 129, 2016, pp. 214-222. (Impact factor 2.06¹)

¹ From SJR cites/doc. (2 years).

6. Iovnovich, M., Raveh, D., Michaels, D. and Adar, M., "Reynolds-averaged Navier-Stokes Study of the Transonic Limit Cycle Oscillation Phenomenon on the F-16 Fighter Aircraft", 2016, *Journal of Aircraft*, 1-11. (Impact factor 1.52¹)
7. Michaels, D., Shanbhogue, S.J., and Ghoniem, A.F., "The impact of reactants composition and temperature on the flow structure in a wake stabilized laminar lean premixed CH₄/H₂/air flames; mechanism and scaling", *Combustion and Flame*, 176 (2017): 151-161. (Impact factor 4.46¹)
8. Chakroun, N.W, Michaels, D., Shanbhogue, S.J., and Ghoniem, A.F., "Response of Premixed Stoichiometric Oxy-Flames to Strain; Role of Chemistry and Transport", Accepted to *Journal of Propulsion and Power*. 2017. DOI: 10.2514/1.B36665 (Impact factor 1.73¹)
9. Michaels, D., Ghoniem, A.F., "Leading Edge Dynamics of Lean Premixed Flames stabilized on a Bluff Body", Accepted to *Combustion and Flame*, 2017. (Impact factor 4.46¹)
10. Jimenez, C., Michaels, D., Ghoniem, A.F., "Stabilization of ultra-lean hydrogen enriched inverted flames behind a heat conducting bluff-body and the phenomenon of anomalous blow-off", Accepted to *Combustion and Flame*, 2017. (Impact factor 4.46¹)

B. SUBMITTED FOR PUBLICATION IN PROFESSIONAL JOURNALS

11. Jimenez, C., Michaels, D., Ghoniem, A.F., "Ultra-lean hydrogen-enriched oscillating flames behind a heat conducting bluff-body: anomalous and normal blow-off", Submitted to *Proceedings of the Combustion Institute* on December 2017.
12. Donggang, C., Guoqiang, H, Fei, Q, Michaels, D., "Local Supersonic and Subsonic Combustion Mode Transition in a Supersonic Jet", Submitted to *Proceedings of the Combustion Institute* on December 2017.

C. PATENTS

1. Gany, A. and Michaels, D., "Propulsion System and Method Using a Combustion Chamber Discharging a Concentrated Mass". United States Patent No. US 8,789,795 B2, filed March 3, 2010, granted July 29, 2014. Israeli Patent No. 197387, filed March 3, 2009, granted May 1, 2014.

D. SELECTED PUBLICATIONS IN PEER REVIEWED CONFERENCE PROCEEDINGS:

1. Michaels, D. and Gany, A., "Concept and Analysis of Impulse Augmentation Using a Combustion Chamber Discharging a Concentrated Mass", 49th Israel Annual Conference on Aerospace Sciences, Tel Aviv and Haifa, March 4-5, 2009.
2. Michaels, D. and Gany, A., "Modeling of a Short Action Motor Discharging a Weight", 9th International Symposium on Special Topics in Chemical Propulsion, Québec City, Canada, July 9-13, 2012.
3. Michaels, D. and Gany, A., "Formulation and Testing of a Rocket type Thruster Discharging a Weight", AIAA Paper 2013-3770, 49th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, San Jose, California, 15-17 July, 2013.
4. Michaels, D. and Gany, A., "Investigation of a Thruster Based on a Traveling Propellant Charge", 10th International Symposium on Special Topics in Chemical Propulsion, Poitiers, France, 2-6 June 2014. **Won Best Paper Award.**
5. Michaels, D. and Gany, A., "Modeling and Testing of a Novel Thruster Concept for Separation of Bodies in Space", 66th International Astronautical Congress, Jerusalem, Israel, 12-16 October 2015.

¹ From SJR cites/doc. (2 years).

6. Michaels, D., and Ghoniem, A.F., “The Effect of Stretch and Heat Loss on the Anchoring and Response to Acoustic Forcing of a Bluff Body Stabilized Lean Premixed Flame”, AIAA Science and Technology Forum and Exposition on Jan 4-8, 2016.
7. Chakroun, N.W., Michaels, D., Shanbhogue, S.J., and Ghoniem, A.F., “Response of Premixed Stoichiometric CH₄/O₂/CO₂ Flames to Strain; Role of Chemistry and Transport”, AIAA Science and Technology Forum and Exposition, Jan, 2017.
8. Chakroun, N.W., Kewlani, G., Taamallah, S., Michaels, D., Shanbhogue, S.J., and Ghoniem, A.F., “On the Role of Chemical Kinetics Modelling in the LES of premixed bluff body flames”, AIAA Science and Technology Forum and Exposition on Jan 2017.
9. Grinberg Dana, A., Gudiyella, S., Green, W. H., Shanbhogue S.J., Michaels, D., Chakroun N.W., Ghoniem, A.F., “Automated Generation of Chemical Mechanisms for Predicting Extinction Strain Rates with Applications in Flame Stabilization and Combustion Instabilities”, AIAA Science and Technology Forum and Exposition on Jan 2017.
10. Naor, A., Grinberg Dana, A., Michaels, D., “Automatic generation of reduced chemical mechanisms of liquid aviation fuels for application in combustion dynamics computations”, AIAA Science and Technology Forum and Exposition, Jan 2018.

CONFERENCES

Contributed Conference Lectures:

1. 49th Israel Annual Conference on Aerospace Sciences, Tel Aviv and Haifa, March 4-5, 2009. Presentation topic: "Concept and Analysis of Impulse Augmentation Using a Combustion Chamber Discharging a Concentrated Mass". Speaker: Michaels, D.
2. 50th Israel Annual Conference on Aerospace Sciences, Tel Aviv and Haifa, February 17-18, 2010. Presentation topic: "The Influence of Wing Mounted Stores and Wing-Tip Aerodynamics on the Aeroelastic Characteristic of Fighter Aircrafts". Speaker: Michaels, D.
3. 51st Israeli Annual Conference on Aerospace Sciences, Tel Aviv and Haifa, February 23-24, 2011. Presentation topic: "Flutter Characteristics of Asymmetric F-16 Configurations". Speaker: Michaels, D.
4. 9th International Symposium on Special Topics in Chemical Propulsion, Québec City, Canada, July 9-13, 2012. Presentation topic: "Modeling of a Short Action Motor Discharging a Weight". Speaker: Michaels, D.
5. 49th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit, San Jose, California, 15 - 17 July, 2013. Presentation topic: "Formulation and Testing of a Rocket type Thruster Discharging a Weight". Speaker: Michaels, D.
6. 10th International Symposium on Special Topics in Chemical Propulsion, Poitiers, France, 2-6 June 2014. Presentation topic: "Investigation of a Thruster Based on a Traveling Propellant Charge". Speaker: Michaels, D.
7. Israel Air and Missile Defense Conference, Herzliya, Israel, 31 March 2015. Presentation topic: “A Novel Concept for In-Flight Separation Between Missile Stages or Payloads”. Speaker: Gany, A.
8. 66th International Astronautical Congress, Jerusalem, Israel 12 – 16 October 2015. Presentation topic: “Modeling and Testing of a Novel Thruster Concept for Separation of Bodies in Space”. Speaker: Gany, A.

9. The 68th Annual Meeting of the APS Division of Fluid Dynamics, on Nov 22-24, 2015. Presentation topic: “The flame anchoring mechanism and associated flow structure in bluff-body stabilized lean premixed flames”. Speaker: Michaels, D.
10. AIAA Science and Technology Forum and Exposition on Jan 4-8, 2016. Presentation topic: “The Effect of Stretch and Heat Loss on the Anchoring and Response to Acoustic Forcing of a Bluff Body Stabilized Lean Premixed Flame”. Speaker: Michaels, D.
11. Space Propulsion 2016 on May 2-6, 2016. Presented topic: “Investigation of orbit correction via pulses generated by a small thruster ejecting a weight”. Speaker: Gany, A.
12. The 30th Annual Symposium of the Israeli Section of the Combustion Institute on Dec. 29, 2016. Presented topic: “Experimental and Numerical Evidence for Scaling of the Flame-Flow Interaction in Premixed Flames”. Speaker: Michaels, D.
13. AIAA Science and Technology Forum and Exposition, Jan 9-13, 2017. Presented topic: “Response of Premixed Stoichiometric CH₄/O₂/CO₂ Flames to Strain; Role of Chemistry and Transport”. Speaker: Chakroun, N.W.
14. AIAA Science and Technology Forum and Exposition, Jan 9-13, 2017. Presented topic: “On the Role of Chemical Kinetics Modelling in the LES of premixed bluff body flames”. Speaker: Chakroun, N.W.
15. AIAA Science and Technology Forum and Exposition, Jan 9-13, 2017. Presented topic: “Automated Generation of Chemical Mechanisms for Predicting Extinction Strain Rates with Applications in Flame Stabilization and Combustion Instabilities”. Speaker: Grinberg Dana, A.
16. The 31st Annual Symposium of the Israeli Section of the Combustion Institute on Dec. 4, 2017. Presented topic: “Impact of Flame Holder Material on Flame Stabilization”. Speaker: Michaels, D.
17. AIAA Science and Technology Forum and Exposition, Jan 8-12, 2018. Presented topic: “Automatic Generation Of Reduced Chemical Mechanisms Of Liquid Aviation Fuels For Application In Combustion Dynamics Computations”. Speaker: Michaels, D.

INVITED TALKS

1. “Flame-Vortex Interaction – Impact of Fuel Composition and Flame Holder Thermal Properties”, Invited seminar at the Center for Combustion, Power and Propulsion, Department of Mechanical and Nuclear Engineering, Pennsylvania State University, 11 November, 2015.
2. “Investigation of a thruster based on a traveling propellant charge”, Invited seminar at the Center of Energy and Propulsion Research, Massachusetts Institute of Technology, 25 February, 2015.

GRADUATE STUDENTS

Thesis in Progress

Neta Yokev, Supervisor D. Michaels. (2017 – present).

Thesis subject: “Chemistry flow interactions in a Scramjet engine,” (Ph.D.).

Ohad Ben Horin, Supervisor D. Michaels, Adtl. Supervisor: Savely Khosid. (2017 – present).

Thesis subject: “Detailed design optimization of a solid rocket motor,” (M.Sc.)

Alexander Zibitzker, Supervisor D. Michaels. (2017 – present).

“Experimental technique for ablation rate measurement of thermal protecting materials.”

Matan Feldman, Supervisor D. Michaels, Adtl. Supervisor: Eran Sher. (2017 – present).

“Rate limiting constrains in phase-change-materials (PCM) for miniature aircraft propulsion systems.”

Ortal Cohen, Supervisor D. Michaels, Adtl. Supervisor: Yinon Yavor. (2017 – present).

“Combustion of AP/HTPB propellants containing coated nano-aluminum powders.”

Hain Elya Brod, Supervisor D. Michaels. (2017 – present).

“Impact of fuel composition on flame stabilization over a cavity in supersonic flow.”

Nikhil Balasubramanian, Supervisor D. Michaels. (2017 – present).

“Combustion instabilities in a swirl stabilized combustor.”

SUPERVISION OF POST DOCTORAL RESEARCH FELLOW

Oct. 2017 – present

Dr. Cao Donggang.

RESEARCH GRANTS

1. Grant Title: “Scramjet Engine”.
Period: June 2017-May 2018. Funding Agency: Israeli DOD. Budget: 300,000 NIS
Second year extension approved (300,000 NIS starting from June 2018).
2. Grant Title: “Combustion of AP/HTPB propellants containing aluminum nano-powders with different coatings”.
Research proposal approved for 2018. Funding Agency: Israeli DOD. Budget: 200,000 NIS