

# AVSHALOM OFFNER

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## ACADEMIC APPOINTMENTS

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**Leverhulme Trust Early Career Fellow** 07/2020 – present  
*School of Mathematics, The University of Edinburgh*

Research interests:

- Positron emission tomography imaging of droplet dynamics (theory and experiment)
- Dynamics of respiratory droplets (theory and experiment)

**Postdoctoral research fellow** 10/2019 – 06/2020  
*Department of Civil & Environmental Engineering, Technion – Israel Institute of Technology*

Research:

- Acoustic instability in aerosols of volatile droplets (theory)
- Fine-tuned vaporisation of droplets using acoustics (experiment and theory)
- Particle deposition on permeable surfaces (theory)

## EDUCATION

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**PhD (direct track), Interdisciplinary Energy Program** 2014 – 2019  
*Technion – Israel Institute of Technology*

Dissertation: Heat and mass transfer in acoustic energy conversion  
Supervisor: Prof. Guy Ramon

**BSc (*cum laude*), Mechanical Engineering** 2009 – 2013  
*Ben Gurion University of the Negev*

Research project: Turbulent flows on a rotating sphere  
Supervisor: Prof. Semion Sukoriansky

## FUNDING

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**Early Career Fellowship (PI, £170,000)** 2022  
*Leverhulme Trust*

Funding for 3 years to mathematically and experimentally study the spread of respiratory droplets.

**Institutional Strategic Support Fund (PI, £45,000)** 2022  
*Wellcome Trust*

Funding to conduct experiments on the lifetime of respiratory droplets, to complement my mathematical work and validate the theory.

**Aharon and Ephraim Katzir study grant (PI, \$5,000)** 2019  
*Israel Science Foundation*

Early-career research grant to visit Prof. Paul F. Linden at the Department of Applied Mathematics and Theoretical Physics, University of Cambridge.

## PUBLICATIONS

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- Offner, A.**, Hampel, D. M., Kokalova Wheldon, T., On the rate of radioactive leaching between density-matched, immiscible liquids, in preparation.
- Offner, A.**, Hampel, D. M., Kokalova Wheldon, T., Positron emission real-time imaging of droplet dynamics, in preparation.
- Offner, A.**, Manger, S., Vanneste, J., [A probabilistic framework for uncertainty quantification in positron emission particle tracking](#), *Inverse Problems* **39** (5), 055003 (2023).
- Offner, A.**, Vanneste, J., [Airborne lifetime of respiratory droplets](#), *Physics of Fluids* **34**, 053320 (2022).
- Offner, A.**, Ramon, G. Z., [Acoustic instability in aerosols](#), *Journal of Engineering Mathematics* **129**, 16 (2021).
- Offner, A.**, Ramon, G. Z., [The interaction of a particle and a polymer brush coating a permeable surface](#), *Journal of Fluid Mechanics* **913**, R3 (2021).
- Offner, A.**, Berdugo, N., Liberzon, D., [Acoustic-driven droplet evaporation: beyond the role of droplet-gas relative velocity](#), *International Journal of Heat and Mass Transfer* **171**, 121071 (2021).
- Brustin, T., **Offner, A.**, Ramon, G. Z., [Effect of gas mixture on temperature and mass streaming in a phase-change thermoacoustic engine](#), *Applied Physics Letters* **116**(24), 243701 (2020).
- Offner, A.**, Yang, R., Felman, D., Elkayam, N., Agnon, Y., Ramon, G. Z., [Acoustic oscillations driven by boundary mass exchange](#), *Journal of Fluid Mechanics* **866**, 316-349 (2019).
- Meir, A., **Offner, A.**, Ramon, G. Z., [Low-temperature energy conversion using a phase-change acoustic heat engine](#), *Applied Energy* **231**, 372-379 (2018).
- Weltsch, O., **Offner, A.**, Liberzon, D., Ramon, G. Z., [Adsorption-mediated mass streaming in a standing acoustic wave](#), *Physical Review Letters* **118**, 244301 (2017).
- Offner, A.**, Ramon, G. Z., [Modeling of micro-scale thermoacoustics](#), *Applied Physics Letters* **108**, 183902 (2016).

## HONOURS AND AWARDS

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|---|------------|
| <b>Knowledge Exchange Fund (£1,000)</b> , <i>The University of Edinburgh</i><br>Funding to conduct further experiments in collaboration with the Positron Imaging Center at the University of Birmingham. | 2022       |
| <b>Translational Innovation award (£1,000)</b> , <i>iTPA – Wellcome Trust</i><br>Funding to conduct experiments towards commercialisation of research on Positron Emission Particle Tracking.             | 2022       |
| <b>Excellent teaching assistant award</b> , <i>Technion – Israel Institute of Technology</i><br>Award given to teachers ranked within the upper 10% in student surveys.                                   | 2016, 2018 |
| <b>1<sup>st</sup> prize in poster competition</b> , <i>Technion – Israel Institute of Technology</i>  | 2018       |
| <b>2<sup>nd</sup> prize in poster competition</b> , <i>Technion – Israel Institute of Technology</i>  | 2017       |
| <b>Gutwirth fellowship</b> , <i>Technion – Israel Institute of Technology</i><br>A 12 months fellowship awarded to graduate students of exceptional academic record.                                      | 2017       |
| <b>1<sup>st</sup> prize in student Paper competition</b> ,<br><i>The 54<sup>th</sup> Israel annual conference on aerospace sciences</i>   | 2014       |

## ACADEMIC ACTIVITIES

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**Reviewer** for *Journal of Fluid Mechanics*, *Physical Review Fluids*, *Physical Review E* 2018–present  
**Member** of the *American Physical Society* 2016–present

## TEACHING

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**Student project supervision** 2021–2022  
*School of Mathematics, The University of Edinburgh*

Supervising Ceilidh Alexander, a 4<sup>th</sup> year undergraduate maths student in a project entitled “Acoustic attenuation in long channels”.

**Teaching assistant** 2014–2020  
*Technion – Israel Institute of Technology*

Taught classes of 30 – 50 students; was continuously ranked amongst the top 10% of tutors; received an excellence award twice. The table below summarises the courses I taught, along with the student survey markings I received.

Course	Level	Survey marking
fluid mechanics	undergraduate	4.3/5
numerical methods	undergraduate	4.67/5
heat transfer	undergraduate	4.8/5
applied mathematics for engineers	graduate	no surveys for graduate courses

## INVITED TALKS

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### Uncertainty quantification in positron emission particle tracking

- School of Science and Engineering, University of Dundee. 10/2022
- PEPT User Day, University of Birmingham. 10/2022
- Workshop on industrial and applied mathematics, Glasgow. 09/2022
- Department of Chemical Engineering, Imperial College London. 05/2022
- Mathematical Institute, University of Oxford. 05/2022

### Dynamics and lifetime of respiratory droplets

- Department of Mathematics & Statistics, University of Strathclyde. 10/2021
- School of Engineering, The University of Edinburgh. 06/2021

**Heat and mass transfer in acoustic energy conversion** 12/2019  
Department of Solar Energy and Environmental Physics, Ben Gurion University of the Negev.

**Concentration-driven acoustic energy conversion** 03/2019  
Department of Applied Mathematics and Theoretical Physics, Cambridge University.

**Review of the Israeli energy market** 01/2017  
Lecture given to a delegation of energy specialists from Georgia, Kfar Maccabiah.

## CONFERENCE ORGANISATION

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### British Applied Mathematics Colloquium 2022 (11-13/04/2022)

Organising a mini-symposium entitled “Modelling the respiratory transmission of Covid-19”

## CONFERENCE PRESENTATIONS

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- Offner, A.**, Employing PET to study the dynamics of droplets in fluid flows, *Fluidization 2023*, Edinburgh, (2023).
- Offner, A.**, Manger, S. P., Vanneste, J., Uncertainty quantification in Positron Emission Particle Tracking , *Total-body PET 2022*, Edinburgh, (2022).
- Offner, A.**, Vanneste, J., Airborne lifetime of respiratory droplets, *British Applied Mathematics Colloquium*, Loughborough, (2022).
- Offner, A.**, Vanneste, J., Dynamics and lifetime of respiratory saliva droplets, *UK Fluids conference*, Southampton (online), (2021).
- Offner, A.**, Vanneste, J., Uncertainty in recovering particle trajectory from PEPT data, *ICTAM 2020+1*, Milan (online), (2021).
- Offner, A.**, Vanneste, J., Dynamics and lifetime of respiratory saliva droplets, *Droplets 2021*, Darmstadt (online), (2021).
- Offner, A.**, Ramon, G. Z., Concentration driven acoustic instability in aerosols, *Droplets 2019*, Durham, (2019).
- Offner, A.**, Meir, A., Yang, R., Felman, D., Elkayam, N., Agnon, Y., Ramon, G. Z., Low-temperature energy recovery through acoustic heat engines driven by boundary mass exchange, *International Congress on Industrial and Applied Mathematics*, Valencia (2019)
- Offner, A.**, Meir, A., Ramon, G. Z., Phase-exchange thermoacoustics, *APS DFD*, Denver (2017).
- Offner, A.**, Ramon, G. Z., Micro-scale thermoacoustics, *APS DFD*, Portland (2016).
- Offner, A.**, Turbulent flows on a rotating sphere research, *54th Israel Annual Conference on Aerospace Sciences*, Tel Aviv (2014).