

# Ram Tuvi | Curriculum Vitae

Institute for Geophysics, Jackson School of Geosciences, The University of Texas At Austin,  
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## Research area

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Waves propagation and scattering in complex media. Analytical methods in wave theory for frequency and time domains. Electromagnetics inverse scattering. Geophysical imaging and inversion. Computational and analytical methods in electromagnetics acoustics and seismology.

## Education

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- **PhD Electrical Engineering – Tel Aviv University** **10/2013–12/2018**  
*Beam-Based Local Tomographic Inverse Scattering* *Tel Aviv, Israel*  
Supervisors: Prof. Ehud Heyman and Prof. Timor Melamed.  
Final GPA: 97.73  
I derived mathematical and physical tools for analyzing wave propagation and processing using beam waves. It enables me to study local wave phenomena in large scale propagation and scattering environments. I used these studies to develop and implement new inverse scattering using also signal processing, mathematical and computational tools.
- **M.sc – Electrical Engineering – Ben Gurion University (Cum Laude)** **10/2010–1/2013**  
*Gaussian Beam Diffraction by a Fast Moving Wedge* *Beer Sheva, Israel*  
Supervisor: Prof. Timor Melamed.  
Final GPA 94.69  
I derived asymptotic models for the scattering of electromagnetic waves from complex objects. I used beam summation methods to decompose a complex object to different basic shapes. I derived exact and asymptotic models for the scattering of a Gaussian beam from a moving wedge.
- **B.Sc in Electrical and Computer Engineering – Ben Gurion University** **10/2006–10/2010**  
*Focus in Electromagnetics, Electroptics* *Beer Sheva, Israel*  
Final GPA 88.86.

## Academic Positions

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- **Postdoctoral fellow – The University of Texas at Austin (Prof. Mrinal K. Sen)** **1/2019–Present**  
*Wave propagation and inversion in complex media.* *Austin, Texas, USA*  
I develop new physical based imaging and inversion theories in large inhomogeneous media. I establish wave processing tools to analyze large data set, to study wave physics in these complex environments. I combine these physical models with computational methods to derive physical-based inversion algorithms.

## Teaching Experience

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### Tel Aviv University.....

- **Teaching Assistant** **10/2014–12/2018**  
Tutoring the courses: “Wave Transmission and Distributed Systems,” (undergraduate level Hebrew and English), “Propagation and Scattering of Waves,”(undergraduate and graduate levels), “Antennas and Radiation”(undergraduate and graduate levels) .  
Writing homework sets, projects and exams.  
Mentoring and evaluating students through their projects.

### Ben Gurion University.....

- **Teaching Assistant** **10/2010–10/2012**  
Tutoring the courses: “Introduction to Microwaves,” (undergraduate level), “Propagation and Scattering of Waves,”(undergraduate level), “Introduction to Electrical and Electronic Engineering A1”(undergraduate levels).
- **Lab instructor** **10/2010–10/2012**  
Instructing the labs: “Introductory Microcomputers Laboratory,” (undergraduate level), “Laboratory to Electrical and Electronic Engineering”(undergraduate level).  
Guiding students through laboratory experiments, preparing pre-lab assignments and evaluating final lab reports.

## Position in the Industry

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- **GOJI food solutions** **10/2011–10/2014**  
○ *Electromagnetics engineer.* *Israel*  
Electromagnetics engineer in the research and development team. Developing new antennas and microwave cavities, working with simulation software CST, writing algorithms for field and signal processing.

## Professional Activities

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- Journal of Seismic Exploration - Reviewer.
- Geophysics - Reviewer.

## Awards and Honors

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- 1<sup>st</sup> year excellence in engineering.
- Best student paper award – 2014 IEEE 28th Convention of Electrical & Electronics Engineers in Israel.

## List of publications

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### Book Chapters.....

1. **R. Tuvi**, E. Heyman and T. Melamed, “beam-based local diffraction tomography”, in *Advances in Mathematical Methods for Electromagnetics* (to be published).

### Refereed articles in scientific journals.....

2. **R. Tuvi** and T. Melamed, “Asymptotic analysis of plane wave scattering by a fast moving PEC wedge,” in *IEEE Transactions on Antennas and Propagation*, vol. 65, no. 7, pp. 3638-3644, Jul. 2017 (IF 4.1, Q1).
3. **R. Tuvi**, E. Heyman, and T. Melamed, “Beam summation representation for ultra-wide-band radiation from volume source distributions, ” in *IEEE Transactions on Antennas and Propagation*, vol. 67, no. 2, pp. 1010-1024, Feb. 2019 (IF 4.4, Q1).
4. **R. Tuvi** and T. Melamed, “ Astigmatic Gaussian Beam Scattering by a PEC Wedge”, in *IEEE Transactions*

on *Antennas and Propagation*, vol. 67, no. 11, pp. 7014-7021, Nov. 2019 (IF 4.4, Q1).

5. **R. Tuvi**, E. Heyman, and T. Melamed, "Beam-based local tomographic inverse scattering. Part I: the forward problem," in *IEEE Transactions on Antennas and Propagation*, vol. 68, no. 10 pp. 7144-7157, Oct. 2020 (IF 4.4, Q1).
6. **R. Tuvi**, E. Heyman, and T. Melamed, "Beam-based local tomographic inverse scattering. Part II: the inverse problem" in *IEEE Transactions on Antennas and Propagation*, vol. 68, no. 10 pp. 7158-7169, Oct. 2020 (IF 4.4, Q1).
7. **R. Tuvi**, Z. Zhao, and M. K. Sen, "Multi frequency beam-based migration in inhomogeneous media using windowed Fourier transform frames" in *Geophysical Journal International*, vol. 223, issue 2, Pages 1086–1099, Nov. 2020 (IF 2.6, Q2).

#### Refereed articles in scientific journals (under review).....

8. **R. Tuvi**, Z. Zhao, and M. K. Sen, "A fast least squares migration with ultra-wide-band phase-space beam summation method".
9. **R. Tuvi**, Z. Zhao, and M. K. Sen, "A compressed data approach for image domain least-squares migration".
10. **R. Tuvi** and T. Melamed, "Astigmatic Gaussian Beam Scattering by a fast moving PEC Wedge".

#### Refereed articles in scientific journals (in preparation).....

11. **R. Tuvi**, Z. Zhao, and M. K. Sen, "Time-dependent beam-based migration in inhomogeneous media using windowed Radon transform frames".
12. J. Vamaraju, **R. Tuvi**, Z. Zhao, and M. K. Sen, " Optimal mini-batch shot selection for target-oriented least-squares reverse time migration ".

#### Papers in Conference Proceedings .....

1. **R. Tuvi** and T. Melamed, "Gaussian beam diffraction by a fast moving PEC wedge via plane wave spectral decomposition," *IEEE 27-th Convention of Electrical and Electronics Engineers in Israel*, November 2012.
2. **R. Tuvi** and T. Melamed, "Gaussian beam diffraction by a fast moving wedge," *2013 URSI International Electromagnetic Theory*, Hiroshima, Japan, 2013, pp. 901 – 904.
3. **R. Tuvi** and T. Melamed, "Scalar pulsed beam scattering by a fast moving soft wedge," *the XXXI General Assembly and Scientific Symposium (URSI GASS)*, Beijing, China, 2014.
4. **R. Tuvi** and T. Melamed, "Pulsed beam scattering by a fast moving PEC wedge," *IEEE 28th Convention of Electrical & Electronics Engineers in Israel (IEEEI)*, 2014 (**received the "Best Student Paper Award"**), pp. 226-230.
5. M. Leibovich, **R. Tuvi**, and E. Heyman. "The propagating frame: A novel framework for wave tracking through rough medium and for inverse scattering," *Joint IEEE AP-S and URSI Symposium*, Vancouver, Canada, July 2015.
6. **R. Tuvi**, E. Heyman and T. Melamed, "Propagating beam frame: A novel formulation for time-dependent radiation and scattering," *2016 URSI International Symposium on Electromagnetic Theory (EMTS)*, Espoo, 2016, pp. 169-172.
7. **R. Tuvi**, E. Heyman and T. Melamed, "Propagating Beam Frame: A Novel Formulation For Local Inverse Scattering," *the XXXII General Assembly and Scientific Symposium (URSI GASS)*, 2017, Montreal Canada, paper B37-3, 4 pages.
8. **R. Tuvi**, E. Heyman, and T. Melamed, "Beam domain formulation for tomographic inverse scattering part I: The forward problem," *Joint IEEE AP-S and URSI Symposium*, Boston, Massachusetts, July 2018.
9. **R. Tuvi**, E. Heyman, and T. Melamed, "Beam domain formulation for tomographic inverse scattering part II: The inverse problem," *Joint IEEE AP-S and URSI Symposium*, Boston, Massachusetts, July 2018.
10. **R. Tuvi**, E. Heyman, and T. Melamed, "Beam-frame formulation for time-dependent tomographic inverse

scattering in a noisy background (invited)," *International Symposium on Electromagnetic Theory (EMTS 2019)*, May, 2019 San Diego, USA.

11. **R. Tuvi**, T. Melamed, and E. Heyman, "Beam-based time-dependent tomographic inverse scattering. Part I: Beam-domain phase space data processing and interpretation," *Applied Inverse Problems Conference (AIP 2019)*, Institute Fourier, Grenoble University, July 8-12, 2019.
12. **R. Tuvi**, T. Melamed, and E. Heyman, "Beam-based time-dependent tomographic inverse scattering. Part II: Local reconstruction," *Applied Inverse Problems Conference (AIP 2019)*, Institute Fourier, Grenoble University, July 8-12, 2019.
13. **R. Tuvi**, E. Heyman, and T. Melamed, "Beam-based time-domain tomographic inverse scattering," *International Conference on Electromagnetics in Advanced Applications (ICEAA)*, October 2019.
14. **R. Tuvi**, Z. Zhao, and M. K. Sen "A phase-space beam summation imaging in inhomogeneous medium," *SEG Technical Program Expanded Abstracts 2019*, August 2019, 4356-4360.
15. **R. Tuvi**, Z. Zhao, and M. K. Sen "A fast image domain least squares migration method with local data target approach," *SEG Technical Program Expanded Abstracts*, September 2020.
16. J. Vamaraju, **R. Tuvi**, Z. Zhao, and M. K "Optimal mini-batch shot selection for target-oriented least-squares reverse time migration," *SEG Technical Program Expanded Abstracts*, September 2020.