Huseyin Tunc, Ph.D.

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Employment History

2022 – · · · · **Assistant Professor,** Biostatistics and Medical Informatics Department, Faculty of Medicine, Bahcesehir University, Turkey.

2018 – 2022 **Project Researcher.** Theoretical Biology Laboratory, Faculty of Medicine, Bahcesehir University, Turkey.

2016 – 2018 **Lecturer.** Mathematics Department, Esenyurt Municipality Continuous Education Center, Turkey.

Education

2017 – 2021 **Ph.D. Mathematics, Yildiz Technical University** in Applied Mathematics.
Thesis title: *An implicit-explicit local method for stiff differential equations.*
Supervisor: *Prof. Dr. Murat Sari*.

2015 – 2017 **M.Sc. Mathematics Engineering, Yildiz Technical University** in Applied Mathematics.
Thesis title: *Various finite element techniques for advection-diffusion-reaction processes*.
Supervisor: *Prof. Dr. Murat Sari*.

2010 – 2015 **B.Sc. Mathematics, Ege University** in Applied Mathematics
Thesis title: *Numerical integration and applications*.
Supervisor: *Prof. Dr. Turgut Ozis*.

Research Publications

Journal Articles

1. E. Celik, H. Tunc, and M. Sari, "An efficient multi-derivative numerical method for chemical boundary value problems," *Journal of Mathematical Chemistry*, vol. ahead-of-print, no. ahead-of-print, ahead-of–print, 2023.
2. H. Tunc, B. Dogan, B. N. D. Kiraz, M. Sari, S. Durdagi, and S. Kotil, "Prediction of HIV-1 protease resistance using genotypic, phenotypic, and molecular information with artificial neural networks," *PeerJ*, vol. 11, e14987, 2023.
3. H. Tunc and M. Sari, "A spatial local method for solving 2D and 3D advection-diffusion equations," *Engineering Computations*, vol. 40, no. 9/10, pp. 2068–2089, 2023.
4. H. Tunc, M. Sari, and S. Kotil, "Machine learning aided multiscale modelling of the HIV-1 infection in the presence of NRTI therapy," *PeerJ*, vol. 11, e15033, 2023.
5. H. Tunc, M. Sari, and S. E. Kotil, "Effect of sojourn time distributions on the early dynamics of COVID-19 outbreak," *Nonlinear Dynamics*, pp. 1–18, 2023.
6. M. Sari, H. Kocak, and H. Tunc, "A space-time Chebyshev spectral collocation method for the reaction–dispersion equations with anti-kink-type waves," *International Journal of Modern Physics C*, vol. 33, no. 08, p. 2 250 104, 2022.

7. H. Tunc and M. Sari, "An implicit-explicit local method for parabolic partial differential equations," *Engineering Computations*, vol. 39, no. 3, pp. 1020–1037, 2022.

8. H. Tunç, M. Sari, and S. H. Mussa, "Pade-Legendre reconstruction for finite difference solutions of shock problems," *Azerbaijan Journal of Mathematics*, vol. 12, no. 2, pp. 45–60, 2022.

9. H. Tunc and M. Sari, "A new implicit-explicit local method to capture stiff behavior with COVID-19 outbreak application," *arXiv preprint arXiv:2104.05817*, 2021.

10. H. Tunc and M. Sari, "A stability preserved time-integration method for nonlinear advection-diffusion-reaction processes," *Journal of Mathematical Chemistry*, vol. 59, no. 8, pp. 1917–1937, 2021.

11. H. Tunc and M. Sari, "A stabilized discontinuous Galerkin method for the nonlinear advection-diffusion processes," *Proceedings of the Institute of Mathematics and Mechanics*, vol. 47, no. 1, pp. 24–45, 2021.

12. H. Tunç and M. Sari, "A new implicit-explicit local differential method for boundary value problems," *Turkish Journal of Mathematics*, vol. 45, no. 2, pp. 742–766, 2021.

13. H. Tunc, F. Z. Sari, B. N. Darendeli, R. Nashebi, M. Sari, and S. Kotil, "Analytical solution of equivalent SEIR and agent-based model of COVID-19; showing the bounds of contact tracing," *medRxiv*, pp. 2020–10, 2020.

14. H. Tunc and M. Sari, "Simulations of nonlinear advection-diffusion models through various finite element techniques," *Scientia Iranica*, vol. 27, no. 6, pp. 2853–2870, 2020.

15. M. Sari, S. H. Mussa, and H. Tunc, "A higher order compact scheme for the nonlinear advection diffusion processes.," *Proceedings of Institute of Mathematics & Mechanics National Academy of Sciences of Azerbaijan*, vol. 45, no. 2, 2019.

16. M. Sari, H. Tunc, and M. Seydaoglu, "Higher order splitting approaches in analysis of the Burgers equation," *Kuwait Journal of Science*, vol. 46, no. 1, 2019.

17. H. Tunc and M. Sari, "A local differential transform approach to the cubic nonlinear Duffing oscillator with damping term," *Scientia Iranica*, vol. 26, no. 2, pp. 879–886, 2019.

18. H. Tunc and M. Sari, "An efficient local transform method for initial value problems," *Sigma Journal of Engineering and Natural Sciences*, vol. 37, no. 1, pp. 163–174, 2019.

19. M. Sari and H. Tunc, "Finite element based hybrid techniques for advection-diffusion-reaction processes," *An International Journal of Optimization and Control: Theories & Applications (IJOCTA)*, vol. 8, no. 2, pp. 127–136, 2018.

20. M. Sari and H. Tunc, "An optimization technique in analyzing the Burgers equation," *Sigma Journal of Engineering and Natural Sciences*, vol. 35, no. 3, pp. 369–386, 2017.

Conference Proceedings

1. E. O. Asan, M. Sari, E. S. Kotil, and H. Tunc, "Mechanistic modelling of contact tracing and isolation policies," in *Sixth International HYBRID Conference on Mathematical Advances and Applications*, Yildiz Technical University, Istanbul, Turkey, 2023.

2. F. N. Budak, M. Sari, and H. Tunc, "Machine learning models in the diagnosis of Alzheimer disease," in *Sixth International HYBRID Conference on Mathematical Advances and Applications*, Yildiz Technical University, Istanbul, Turkey, 2023.

3. E. Celik, M. Sari, and H. Tunc, "A local Taylor series method for nonlinear singular boundary value problems," in *Sixth International HYBRID Conference on Mathematical Advances and Applications*, Yildiz Technical University, Istanbul, Turkey, 2023.

4. E. Kurul, M. Sari, and H. Tunc, "Numerical investigation of stiff epidemiological models," in *Sixth International HYBRID Conference on Mathematical Advances and Applications*, Yildiz Technical University, Istanbul, Turkey, 2023.
5. S. Yilmaz, M. Sari, and H. Tunc, "Prediction of HIV-1 nucleoside reverse transcriptase resistance with artificial neural networks," in *Sixth International HYBRID Conference on Mathematical Advances and Applications*, Yildiz Technical University, Istanbul, Turkey, 2023.
6. H. Tunc and M. Sari, "Extreme learning machine approach for solving ordinary differential equations arising in biology," in *Sixth International Conference on Analysis and Applied Mathematics (ICAAM2022)*, Antalya, Turkey, 2022.
7. H. Tunc and M. Sari, "An implicit-explicit local transform method for capturing stiff behavior of singularly perturbed boundary value problems," in *4th International Conference on Mathematical Advances and Applications (ICOMAA21)*, Istanbul, Turkey, 2021.
8. H. Tunc and M. Sari, "Multi-derivative, multi-stage and multi-step time integration methods," in *International Conference on Applied Mathematics in Engineering (ICAME)*, Balıkesir, Turkey, 2021.
9. H. Tunc and M. Sari, "Analysis of steep behavior in the Burgers equation," in *International Conference on Mathematics and Engineering*, Istanbul, Turkey, 2017.
10. H. Tunc and M. Sari, "Discussion of advection-diffusion process in finite element techniques," in *The Second International Conference on Computational Mathematics and Engineering Sciences (CMES2017)*, Istanbul, Turkey, 2017.

Miscellaneous Experience

Awards and Achievements

2021 **Post-doctorate Project Fellowship**, Science Fellowships and Grant Programs Department of TUBITAK (TUBITAK BIDEB), 2218 Program, Project Number: 121C523.

2017 **Doctorate Fellowship**, Science Fellowships and Grant Programs Department of TUBITAK (TUBITAK BIDEB), 2211A Program.

Projects

2020-2022 **Researcher** TUBITAK-BIDEB 2232 International Fellowship for Outstanding Researchers - Early Stage Researchers, Multiscale modelling of infectious diseases; population-wide models to control infectious diseases to constructing novel antisense and small molecule-based therapy against drug resistance, Project Participation/Departure Dates: 01.02.2020 - 20.06.2022, Project Start/End Dates: 01.02.2020 - 01.08.2023, Project Number: 118C244

2022-2024 **Principal Investigator** TUBITAK-BIDEB 2218 Post-doctorate Project Fellowship, Machine learning techniques for modeling the efficacy of drugs against resistant HIV-1 variants, Project Participation/Departure Dates: 15.10.2022 - Ongoing, Project Start/End Dates: 15.10.2022 - 15.10.2024, Project Number: 121C523

2024-2027 **Researcher** TUBITAK-ARDEB 1001 - Scientific and Technological Research Projects Support Program, Development of dynamic structure-based pharmacophore models for the discovery of new active Yb-1 inhibitors: use of molecular dynamics trajectories in accelerated virtual screening, Recently Accepted.

Research Areas

- Mathematical biology and modeling,
- Numerical methods for ODEs/PDEs,
- Deep learning aided numerical analysis,
- Scientific machine learning,
- Numerical linear algebra,
- Scientific computing and optimization,
- Biostatistics and Bioinformatics.

Skills

Languages	Reading, writing and speaking competencies for Turkish (Native) and English.
Coding	Python, MATLAB, SPSS, LaTeX, …
Misc.	General mathematics, statistics, probability, scientific computing, machine learning, coding, mathematical modeling, academic research, teaching, literature review, etc.

References

Available on Request