

Derya Altıntan

Assoc. Prof. Dr.

Hacettepe University
Department of Mathematics
Ankara, Türkiye
☎ +90 (312) 297 78 50/119
✉ deryaaltintan@hacettepe.edu.tr



Research Interests: Mathematical Modeling, Mathematical Biology, Numerical Solutions of Differential Equations, Epidemic Models, Signalling Pathways, Markov Jump Processes, Monte-Carlo Markov Chains, Stochastic Modeling of Reaction Systems, Stochastic Differential Equations and their applications, Neural Networks, Stochastic Modeling of Malware Propagation and Cyber Attacks.

EDUCATION

- 2006–2011 **Ph. D. Scientific Computing**, Institute of Applied Mathematics, METU,
Title: *An Extension to the Variational Iteration Method for Systems and Higher-Order Differential Equations*
Supervisors: Prof. Dr. Ömür Uğur
- 2009–2010 **Visiting Researcher**, Mathematics, Karlsruhe Institute of Technology,
Host: Prof. Dr. Tobias Jahnke
- 2003–2006 **M. S. Scientific Computing**, Institute of Applied Mathematics,, METU,
Title: *Equations of the Logistic Equation with Piecewise Constant Argument*
Supervisors: Prof. Dr. Marat Akhmet, Prof. Dr. Tanıl Ergenç
- 1999–2003 **B. S. Mathematics**, Ankara University,

SKILLS

Languages

Turkish

Native

English

High Level, ÜDS 2011, 81.25; YÖKDİL 2020, 90

German

Beginner, Goethe-Institut Ankara A1.1 Certificate

Software

LaTeX, MATLAB, R

ACADEMIC APPOINTMENTS

- 2021– **Associate Professor**, *Department of Mathematics, Hacettepe University, Ankara, Türkiye*
- 2024–2026 **Associate Professor (Visiting)**, *Department of Mathematics, Hacettepe University – Joint Program at the Türkiye-Azerbaijani University, Baku, Azerbaijan*
- 2019–2021 **Associate Professor**, *Department of Mathematics, Selçuk University, Konya, Türkiye*
- 2017–2019 **Assistant Professor**, *Department of Mathematics, Selçuk University, Konya, Türkiye*
- 2014 – 2014 **DAAD Young Visiting Researcher**, *Bioinspired Communication Systems, Technische Universität Darmstadt , Darmstadt, Germany*
June December
- Host: Prof. Dr. Heinz Koepl
- 2013 – 2014 **International Postdoctoral Visiting Researcher**, *Automatic Control Laboratory, BISON Group, ETH Zurich, Zurich, Switzerland*
April April
- Host: Prof. Dr. Heinz Koepl
- 2012–2017 **Dr. Research Assistant**, *Department of Mathematics, Selçuk University, Konya, Türkiye*
- 2009–2010 **Visiting Researcher** , *Department of Mathematics, Karlsruhe Institute of Technology, Karlsruhe, Germany*
- Host: Prof. Dr. Tobias Jahnke
- 2004–2012 **Research Assistant**, *Department of Scientific Computing, Institute of Applied Mathematics, METU, Ankara*

RESEARCH VISITS

- 2023 – 2023 **Bioinspired Communication Systems**, *Technische Universität Darmstadt , Darmstadt, Germany*
March June
- Host: Prof. Dr. Heinz Koepl
- 2018 – 2018 **Bioinspired Communication Systems**, *Technische Universität Darmstadt , Darmstadt, Germany*
August September
- Host: Prof. Dr. Heinz Koepl
- 2018 – 2018 **Bioinspired Communication Systems**, *Technische Universität Darmstadt , Darmstadt, Germany*
June June
- Host: Prof. Dr. Heinz Koepl
- 2018 – 2018 **Bioinspired Communication Systems**, *Technische Universität Darmstadt , Darmstadt, Germany*
January February
- Host: Prof. Dr. Heinz Koepl
- 2017 – 2017 **Bioinspired Communication Systems**, *Technische Universität Darmstadt , Darmstadt, Germany*
August September
- Host: Prof. Dr. Heinz Koepl
- 2017 – 2017 **Bioinspired Communication Systems**, *Technische Universität Darmstadt , Darmstadt, Germany*
January February

Host: Prof. Dr. Heinz Koepl

2016 – 2016 **Bioinspired Communication Systems**, *Technische Universität Darmstadt*,
February February Darmstadt, Germany

Host: Prof. Dr. Heinz Koepl

2015 – 2015 **Bioinspired Communication Systems**, *Technische Universität Darmstadt*,
September September Darmstadt, Germany

Host: Prof. Dr. Heinz Koepl

2015 – 2015 **Bioinspired Communication Systems**, *Technische Universität Darmstadt*,
January February Darmstadt, Germany

Host: Prof. Dr. Heinz Koepl

PUBLICATIONS

Published Papers published in International Journals

- ALTINTAN DERYA, UĞUR ÖMÜR (2009). Variational iteration method for Sturm-Liouville differential equations. *Computers & Mathematics with Applications*, 58(2), 322-328.
- JAHNKE TOBIAS, ALTINTAN DERYA (2010). Efficient simulation of discrete stochastic reaction systems with a splitting method. *BIT Numerical Mathematics*, 50(4), 797-822.
- ALTINTAN DERYA, UĞUR ÖMÜR (2011). Generalisation of the Lagrange multipliers for variational iterations applied to systems of differential equations. *Mathematical and Computer Modelling*, 54, 2040-2050.
- ALTINTAN DERYA, UĞUR ÖMÜR (2013). Solution of Initial and Boundary Value Problems by the Variational Iteration Method. *Journal of Computational and Applied Mathematics*, 259, 790-797.
- GANGULY ARNAB, ALTINTAN DERYA, KOEPPL HEINZ (2015). Jump diffusion approximation of stochastic reaction dynamics: Error Bounds and Simulation. *SIAM Journal of Multiscale Modelling and Simulation*, 13(4), 1390-1419.
- ALTINTAN DERYA, PURUTÇUOĞLU GAZİ VİLDA, UĞUR ÖMÜR (2018) Impulsive Expressions in Stochastic Simulation Algorithms. *International Journal of Computational Methods*, 15, 170075.
- ALTINTAN DERYA, PURUTÇUOĞLU GAZİ VİLDA (2018). Exact Stochastic Simulation Algorithms and Impulses in Biological Systems. *International Journal of Computational and Experimental Science and Engineering (IJCE-SEN)*, 4(2), 41-47.
- ALTINTAN DERYA, KOEPPL HEINZ (2020). Hybrid Master Equation for Jump-Diffusion Approximation of Biomolecular Reaction Networks. *BIT Numerical Mathematics*, 60, 261-294.
- GÜLNİHAL MERAL; ALTINTAN DERYA, (2025). Mathematical modeling and analysis for Michaelis–Menten kinetics. *Journal of Mathematical Chemistry*, 1-14.

- YILMAZ F., AYDIN E., TEMOCIN B. Z., ALTINTAN DERYA (2026). Strong Order Runge–Kutta Method for Stochastic Optimal Control Problems of the Merton Jump Diffusion Model. *Optimal Control Applications & Methods*, 47(2), 13.
- ALTINTAN DERYA (2026). Hybrid stochastic algorithms for simulating delayed biochemical reaction networks with monomolecular subsystems. *International Journal of Computer Mathematics*, 21.
- ALTINTAN DERYA (2026). Modified delay chemical master equation and two simulation methods to approximate its solution. *Communications in Statistics–Simulation and Computation*, 25.
- ALTINTAN DERYA, AYDIN E., YILMAZ F., TEMOCIN B. Z. (2027). A new numerical scheme for stochastic control problems of jump-diffusion equations by means of Runge–Kutta method. *Journal of Computational and Applied Mathematics*, 489, 15.

Submitted, Under Review, and Preprints

- ALTINTAN DERYA. [Under Review] Time-Dependent Information Security Risk Assessment via Epidemic Modeling and Neural Surrogates. *Applied Mathematics and Computation*, 2026.
- ALTINTAN DERYA; GÜLNİHAL MERAL [Under Review] Existence, Positivity and Conservation-Based Reduction in Dual Phosphorylation Modules of MAPK Pathways. *Journal of Mathematical Chemistry*, 2026.
- ALTINTAN DERYA, ALT BASTIAN, KOEPPL HEINZ. [Preprint] Bayesian inference for jump-diffusion approximations of biochemical reaction networks. *arXiv preprint*, arXiv:2304.06592, 2023.

Chapters in Book

- ALTINTAN DERYA, DIEMER JASHA, KOEPPL HEINZ, Analysis and Modeling of Single Cell Data, Name of the book: Systems of Immunology, Taylor & Francis.

Papers published in National Journals

- ALTINTAN DERYA (2016). Korunumlu döngülerin stokastik simülasyon algoritmalarında kullanımı. *Sakarya Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, 20(3), 617-625.
- BÜŞRANUR OĞRAŞ, DERYA ALTINTAN (2021). Biyokimyasal Reaksiyon Sistemlerinin Modellenmesi için Deterministik ve Stokastik Yaklaşım. *Selcuk University Journal of Science Faculty*, 47(1), 1-15.

Proceedings

- AKHMET MARAT, ALTINTAN DERYA, ERGENÇ TANIL (2011). Chaos of the Logistic Equation with Piecewise Constant Argument. *Proceedings of Dynamic Systems and Applications*.
- GANGULY ARNAB, ALTINTAN DERYA, KOEPPL HEINZ (2015). Error bound and simulation algorithm for piecewise deterministic approximations of stochastic reaction systems. *2015 American Control Conference*.

- ALTINTAN DERYA, GANGULY ARNAB, KOEPPL HEINZ (2016). Efficient simulation of multiscale reaction networks: A multilevel partitioning approach. ACC 2016.
- YAZICI MÜGE, PURUTÇUOĞLU GAZİ VİLDA, ALTINTAN DERYA (2016). Application of Stochastic Simulations of Biological Networks Under Different Impulsive Scenarios. Proceedings of The Third International Conference on Data Mining, Internet Computing.
- ALTINTAN DERYA (2025). Modeling Malware Spread in Information Security Systems using a Stochastic SEIR-Neural Network Approach. International Conference of Numerical Analysis and Applied Mathematics ICNAAM 2025 .

PRESENTATIONS

Presentations in International Conferences

- ALTINTAN DERYA, UĞUR ÖMÜR (2009). Generalized Multistage Variational Iteration Method. 8th ENUMATH 2009, 29 June–3 July 2009, Uppsala, Sweden.
- ALTINTAN DERYA, UĞUR ÖMÜR (2009). How to solve boundary value problems by using Variational Iteration Method. 24th Biennial Conference on Numerical Analysis, 28 June– 11 July 2011, Glasgow, United Kingdom.
- ALTINTAN DERYA, UĞUR ÖMÜR (2012). Logistic Equation with Stochastic Modelling Approach. International Conference on Applied and Computational Mathematics (ICACM), 3-6 October 2012, Ankara, Türkiye.
- ALTINTAN DERYA, UĞUR ÖMÜR (2012). Solutions of Initial and Boundary Value Problems by using Variational Iteration Method, International Conference on Applied and Computational Mathematics (ICACM), 3-6 October 2012, Ankara, Türkiye.
- ALTINTAN DERYA, PURUTÇUOĞLU GAZİ VİLDA, UĞUR ÖMÜR (2013). Impulsive Expression in Chemical Master Equation and Stochastic Simulation Algorithms. 26th European Conference on Operational Research (EURO / INFORMS), 1-4 July 2013, Rome, Italy.
- GANGULY ARNAB, ALTINTAN DERYA, KOEPPL HEINZ (2015). Error bound and simulation algorithm for piecewise deterministic approximations of stochastic reaction systems. 2015 American Control Conference, 3-5 July 2015, Chicago, USA
- ALTINTAN DERYA, PURUTÇUOĞLU GAZİ VİLDA, UĞUR ÖMÜR (2015). Functional Impulses in Exact Stochastic Simulation. ICAPM 2015, 25-18 August 2015, Van, Türkiye
- ALTINTAN DERYA, GANGULY ARNAB, KOEPPL HEINZ (2015). Hybrid Models for Multi-Scale Processes: Error Bounds and Simulation Algorithms, ENUMATH 2015, 14-18 September 2015, Ankara, Türkiye.
- PURUTÇUOĞLU GAZİ VİLDA, ALTINTAN DERYA (2015). Comparison of Performances for Stochastic Simulation Algorithms of Biochemical Networks with/without Impulses., 2nd International Conference on Computational and Experimental Science and Engineering, 14-19 October 2015, Antalya, Türkiye

- ALTINTAN DERYA (2016). Stochastic Modelling with Conservation Relations Hacettepe University, 2nd International Researchers-Statisticians and Young Statisticians Congress, 6-8 Sep-tember 2016. Ankara, Türkiye.
- PURUTÇUOĞLU GAZİ VİLDA, ALTINTAN DERYA (2016). Exact Stochastic Simulation Algorithms Under Different Scenarios of Biological Systems, Hacettepe University, 2nd International Researchers-Statisticians and Young Statisticians Congress, 6-8 September 2016. Ankara, Türkiye.
- ALTINTAN DERYA, GANGULY ARNAB, KOEPPL HEINZ (2017). Maximum Entropy Methods for Jump-Diffusion Approximations of Chemical Kinetics, ENUMATH 2017, 25-29 September 2017, Voss, Norway.
- ALTINTAN DERYA, KOEPPL HEINZ (2018). On Modeling Approaches of Biochemical Reaction Networks, International Conference on Mathematics and Related Sciences (ICMRS 2018), 30 April- 4 May 2018, Antalya, Türkiye.
- ALTINTAN DERYA, KOEPPL HEINZ (2018). Moment Methods for Hybrid Master Equation of Biomolecular Reaction Networks. ICM 2018, 1-9 August 2018, Rio de Janeiro, Brazil.
- ALTINTAN DERYA, KOEPPL HEINZ (2019). Moment Approximation for the Joint Probability Density Function of the Jump-Diffusion Approximation. ENUMATH 2019, 29 September -4 October 2019, Egmond aan Zee, Holland.
- ALTINTAN DERYA, KOEPPL HEINZ (2021). Inference and Marginalization Algorithms for Jump Diffusion Approximation. International Conference on Applied Mathematics in Engineering (ICAME), 1-3 September 2021, Balıkesir, Turkey.
- ALTINTAN DERYA (2021). Numerical Solution Method for Delay Chemical Master Equation. International Conference on Applied Mathematics in Engineering (ICAME), 1-3 September 2021, Balıkesir, Turkey.
- ALTINTAN DERYA, ALT B., KOEPPL H. (2023). Blocked Gibbs Particle Smoothing Algorithm for Jump-Diffusion Approximations of Biochemical Reaction Networks. ENUMATH 2023, 4-8 September 2023, Lisbon, Portugal.
- ALTINTAN DERYA (2024). A hybrid method for simulating biochemical reaction networks with time-delay involving monomolecular reactions. The 3rd International Conference on Applied Mathematics in Engineering (ICAME'24), 26-28 June 2024, Ayvalık-Balıkesir, Türkiye.
- ALTINTAN DERYA (2025). Modeling Malware Spread in Information Security Systems using a Stochastic SEIR-Neural Network Approach. The 23rd International Conference of Numerical Analysis and Applied Mathematics (ICNAAM 2025), 16-22 September 2025, Heraklion, Crete, Greece.
- ALTINTAN DERYA (2026). A Neural-Network-Based Framework for Cryptographic Systems under Hawkes-Driven Attacks. The 4th International Conference on Applied Mathematics in Engineering (ICAME'26), 2-4 September 2026, Balıkesir, Turkey.

Presentations in National Conferences

- AKHMET MARAT, ALTINTAN DERYA, ERGENÇ TANIL (2010). Parçalı sabit fonksiyonlar içeren Lojistik denklemlerin kaotik yapısı, 23. Ulusal Matematik Sempozyumu, 04-07 August 2010, Kayseri.

- JAHNKE TOBIAS, ALTINTAN DERYA (2011). Stokastik Reaksiyon Sistemlerinin Ayrıştırma Metodu ile Simülasyonu, 24. Ulusal Matematik Sempozyumu, 07–10 September 2011, Bursa.
- GANGULY ARNAB, ALTINTAN DERYA, KOEPPL HEINZ (2014). Stokastik reaksiyon sistemlerinin sıçramalı-difüzyon yaklaşımı: hata analizi ve algoritma, 26. Ulusal Matematik Sempozyumu, 26–29 August 2014, İstanbul.
- ALTINTAN DERYA, GANGULY ARNAB, KOEPPL HEINZ (2015). Çok ölçekli reaksiyon sistemleri için hibrid modelleri ve algoritmalar, 10. Ankara Matematik Günleri, 11-12 June 2015, Ankara
- ALTINTAN DERYA (2023). Modeling and Inference Approaches for Biochemical Reaction Networks. Computational Science, Mathematical Modeling and Engineering Conference (BEYOND 2023), 19–20 October 2023, Ankara, Turkey.

GRANTS AND SCHOLARSHIPS

DAAD Young Academicians Scholarship & TUD	07/03/ 2022 – 31/05/2022
DAAD Young Academicians Scholarship & TUD	01/06/ 2014 – 30/11/2014
TÜBİTAK Postdoc Fellowship	2013-2014
TÜBİTAK National Scholarship for PhD Students	2006-2011
TÜBİTAK National Scholarship for B. Sc. Students	2000-2003

SELECTED TEACHING EXPERIENCE

Undergraduate

Calculus I	2024–2025, Fall
Calculus II	2024–2025, Spring
Basic Linear Algebra	2024–2025, Spring
Dinamik Sistemler	2019–2020
Nümerik Analiz	2019–2020
Kompleks Analiz	2018–2019
Nümerik Analiz	2018–2019
Lineer Cebir	2018–2019, Fall
Diferansiyel Denklemler	2018–2019, Fall
Dinamik Sistemler	2017–2018
Differential Equations	2017–2018
Engineering Mathematics	2017–2018
Biomatematik	2016–2017, Fall
Numerical Analysis	2024–2025, Fall
Calculus I	2025–2026, Fall
Differential Equations	2025–2026, Fall
Calculus II	2025–2026, Spring
Linear Algebra	2025–2026, Spring

Graduate

Stochastic Aspects of Dynamics, UME, ODTÜ	2018–2019
Kimyasal Reaksiyonların Matematiksel Modellenmesi, FBE, SÜ	2019–2020
Adi Diferansiyel Denklemlerin Nümerik Çözümleri, FBE, SÜ	2019–2020
R Programlama İle Matematik, FBE, SÜ	2020–2021

PROJECTS

- May 2024– May 2027 **Researcher, TUBİTAK 1001- 124F035**
- *Title:* Development of Efficient and Easy Computational Algorithms Based on the Runge-Kutta Method for Stochastic Optimal Control Problems Representing Financial Models Integrated with Time Delay and Stochastic Factors
 - *Manager:* Fikriye Nuray Yılmaz
- June 2024– June 2025 **Manager, TUBİTAK 1002- 124F043**
- *Title:* Modeling of Delayed Biochemical Reaction Networks with Monomolecular Reaction Channels
 - *B.Sc. Student:* Hasan Bircan
- March– June 2022 **Manager, DAAD Research Stays For Academics and Scientists**
- *Title:* Particle Monte Carlo Markov Chain Method with Hamiltonian Monte Carlo
 - *Advisor:* Prof. Dr. Heinz Koepl
- 2020–2022 **Researcher, METU GAP-109-2020-10282**
- *Title:* Approximate stochastic simulation algorithms in protein interaction networks
 - *Manager:* Prof. Dr. Vilda Purutçuoğlu Gazi
- 2019–2021 **Manager, SELÇUK BAP-19201104**
- *Title:* Stochastic simulation algorithms of chemical reactions
 - *M. Sc. Student:* Büşranur Oğraş
- 2015–2018 **Manager, TÜBİTAK 3501 Career Development Project**
- *Title:* Inference and marginalization algorithms for stochastic biochemical networks with multi-scale nature and their applications.
 - *Advisor:* Prof. Dr. Heinz Koepl
 - *M. Sc. Student:* Merve Haksever
- 2014–2017 **Researcher, METU BAP-08-11-2014-007**
- *Title:* Impulsive expressions in stochastic simulation algorithms for modelling biochemical reaction systems.
 - *Manager:* Prof. Dr. Vilda Purutçuoğlu Gazi
- 2014–2014 **Manager, DAAD 91527068- 50015537 Research Grants-Short Term Grants**
- *Title:* Statistical Inference for stochastic hybrid models of Biochemical Reaction
 - *Advisor:* Prof. Dr. Heinz Koepl
- 2013–2014 **Manager, TÜBİTAK 2219 International Postdoctoral Research Fellowship Program for Turkish Citizens**
- *Title:* Hybrid models for multi-scale processes: HOG signaling pathway as an example
 - *Advisor:* Prof. Dr. Heinz Koepl

STUDENT SUPERVISION

Master Students

2019 **Merve Haksever**

- *Institution:* METU Institute of Applied Mathematics, Department of Scientific Computing
- *Title:* Stochastic modeling of biochemical systems with filtering and smoothing.
- *Supervisors:* Prof. Dr. Ömür Uğur, Doç. Dr. Derya Altıntan

Cont. **Büşranur Oğraş**

- *Institution:* Selçuk University, Department of Mathematics
- *Title:* Stochastic simulation algorithms of chemical reactions
- *Supervisor:* Doç. Dr. Derya Altıntan

Cont. **Yağmur Ataç**

- *Institution:* Selçuk University, Department of Mathematics
- *Title:* Numerical Solutions of Chemical Master Equation
- *Supervisor:* Doç. Dr. Derya Altıntan

CERTIFICATES

The Data Scientist's Toolbox	<i>John Hopkins Bloomberg School of Public Health</i>
Getting and Cleaning Data	<i>John Hopkins Bloomberg School of Public Health</i>
R Programming	<i>John Hopkins Bloomberg School of Public Health</i>

MEMBERSHIPS

Turkish Mathematical Society (TMD)

Association for Turkish Women in Mathematics (TKMD)

European Women in Mathematics (EWM)