MAHIR DEMIR

480 Wilson Rd, Room 22,
Natural Resources Building, East Lansing, MI 48824
☐ Phone: 517 980-4590, @ E-mail: demirmah@msu.edu , **in** Linkedin Webpage

EDUCATION

- **Ph.D. Applied Mathematics**, University of Tennessee, Knoxville — *May 2019*
- **Ph.D. Minor in Computational Science**, University of Tennessee, Knoxville — *May 2019*
- **Ph.D. Minor in Statistics**, University of Tennessee, Knoxville — *May 2019*
- **Master of Science in Mathematics**, University of Tennessee, Knoxville — *December 2017*
- **Master of Science in Mathematics**, Gaziantep University — *June 2012*
- **Master of Arts in Mathematics Education**, Adiyaman University — *June 2010*
- **Bachelor of Science in Mathematics**, Inonu University — *June 2009*

RESEARCH INTERESTS

- Mathematical Modeling in Biological and Ecological Systems, Ecosystem-Based Management Strategies, Optimal Control Theory, Economics of Renewable Resources, Disease Models and Treatment Strategies.

- Data Analysis and Statistical Modeling in Biological and Ecological Systems, Data Mining Methods (Classification and Clustering Methods, and their Algorithms), Stochastic Processes and their Applications.

SKILLS

- Optimization, parameter estimation and sensitivity analysis in dynamical systems, model construction and validation, optimal control, scientific computing, numerical methods for deterministic and stochastic models.

- Machine learning (supervised and unsupervised), data mining methods, data analysis, data visualization.

- Experience in High Performance Computing (HPC), MATLAB, R, Python, C, C++, XPP, SPSS, Excel, LaTeX, MAPLE.

EXPERIENCES AND SELECT PROJECTS

- Improved Ecosystem-based fishery management by using optimal control theory. This study was also featured in the SIAM News Blog: Improving Ecosystem-Based Harvest of the European Anchovy

- Accomplished finding a link between the number of fishing fleets used in fisheries and the harvest rate implemented in fishery models by using statistical tools.

- Showed advantageous of using food chain models in aquatics systems by comparing food chain models with single equation models.

- Built and analyzed (spatial) mathematical models for economics of renewable resources, and optimized ecosystem-based management strategies.

- Optimized net profit of the Black Sea anchovy, and derived optimal management strategies for the fishery.

- Analyzed SIR type infectious disease models and optimized prevention and treatment methods for cholera, HIV/AIDS, and COVID-19.

- Analyzed Ostwald Ripening experiment with crystals of one size and multi sizes, and observed their theoretical predictions numerically.

COURSE HIGHLIGHTS

- **Biometry** (Biological & Ecological Data Analysis and Statistical Modeling in R).

- **Survey and Statistical Methods** (Data Analysis and Data Visualization).

- **Data Mining Methods** & **Applications** (Data preparation, generalized linear models, classification methods, neural networks, model assessment, cluster analysis, and association analysis in R).

- **Stochastic Processes and Probability Theory I and II** (Discrete and continuous stochastic processes, i.e. (Hidden) Markov chain, Brownian motion, and Martingales; probability spaces, random variables, distributions, law of large numbers, and central limit theorem).

- **Optimal Control Theory** (Dynamical Optimization and Cost-Benefit Analysis).

- **Industrial Mathematics** (Modeling for scientific/industrial problems in MATLAB).

- **Programming for Science and Engineering** (Coding in C++, Python, and R).

- **Mathematical Ecology I and II** (Ecological & Infectious Disease Modeling and Stability Analysis).

- **Advanced Math Ecology I** (Sensitivity Analysis and Parameter Estimation in Dynamical Systems).

- **Advanced Math Ecology II** (Network Theory and Models, Model Construction and Validation).

- **Real Analysis and (Advanced) PDE I and II** (Analysis for Foundation of Applied Mathematics, Existence, Uniqueness, Priori Estimates, Week Solutions, and Sobolev Spaces).

PUBLICATIONS

1. Sahin, M. and Demir, M., Lattice-valued Caratheodory Extension Theorem, Archives Des Sciences, Vol 65, No.7; Jul 2012, 89-106.

2. Demir, M. and Lenhart, S. (2019). Optimal sustainable fishery management of the Black Sea anchovy with food chain modeling framework. Nat Resour Modeling, e12253.

3. Demir, M. and Lenhart, S., A Spatial Food Chain Model for the Black Sea Anchovy, and its Optimal Sustainable Fishery, Discrete and Continuous Dynamical Systems Series B (Submitted, 2020).

4. Aslan, H. I, Demir, M., Wise, M. M., and Lenhart, S., Modeling COVID-19: Forecasting and Analyzing the dynamics of the outbreak in Hubei and Turkey, Mathematical Methods in the Applied Sciences(Submitted ,2020) Preprint version is published by the medRxiv [updated 2020 April 15; cited 2020 April 15]. Available from: https://www.medrxiv.org/content/10.1101/2020.04.11.20061952v1

TALKS AND WORKSHOPS

1. Joint Mathematics Meetings, Season on Natural Resources Modeling, Baltimore, USA, January 2019. **Invited Talk :** A PDE Model for the Black Sea Anchovy and Ecosystem-Based Optimal Fishery.

2. Southeastern-Atlantic Regional Conference on Differential Equations in Oakwood GA, October 2018. **Contributed Talk :** Ecosystem-Based Fishery Management for the Black Sea anchovy.

3. SIAM Conference on Mathematics of Planet Earth, Season on Sustainable management of renewable resources, ecosystems, and biodiversity, Philadelphia, USA, September 2018. **Invited Talk :** A Spatial Fishery Model for the Black Sea Anchovy on the Southern Part of the Black Sea. This talk was featured in the SIAM News Blog: Improving Ecosystem-Based Harvest of the European Anchovy

4. NSF-CBMS Conference on Computational Methods in Optimal Control, Jackson State University, Jackson, MS, June 2018. **Labs:** Numerical Solutions of Optimal Control by using GPOPS-II: Next-Generation Optimal Control Software in MATLAB.

5. 46th Annual John H. Barrett Memorial Lectures, Modeling and Analysis of Nonlinear PDEs in Spatial Ecology, University of Tennessee, Knoxville, May 2016.

6. NIMBioS-MBI-CAMBAM Summer Graduate Program: Connecting Models with Biological Data, U of Tennessee, Knoxville, June 2017. **Labs:** Parameter Estimation and Sensitivity Analysis in MATLAB.

7. US-Canadian Institutes Epidemiology Summer School: Mathematical Modeling of Infection Disease Spread at MBI in Columbus Ohio, June 2016.
   Project: Multi-patch Vibrio Cholerae Epidemic Model for Different Treatments.
   Invited Talk: Multi-patch Vibrio Cholerae Epidemic Model for Different Treatments.

TEACHING EXPERIENCE

Main Instructor:

- 2018 - 2019 : Statistical Reasoning (Introduction to data analysis), University of Tennessee, Knoxville.
- Spring 2018 : Basic Calculus, University of Tennessee, Knoxville.
- Fall 2017   : College Algebra, University of Tennessee, Knoxville.
- 2010 - 2012 : Calculus I and II for Banking, Business, and Engineering, Gaziantep University, Gaziantep.
- Fall 2010   : College Algebra and Basic Calculus, Cozum Private Teaching Institution, Ankara.

Teaching Assistant and Grading:

- Spring 2018 : Partial Differential Equations I, University of Tennessee, Knoxville.
- Spring 2017 : Differential Equations I, University of Tennessee, Knoxville.
- Fall 2016   : Numerical Analysis I , University of Tennessee, Knoxville.

WORK EXPERIENCES

- Research Associate, Michigan State University, East Landing, MI   *2019-*
- Graduate Teaching Associate, University of Tennessee, Knoxville, TN   *2015-2019*
- Graduate Research Assistant, Gaziantep University, Gaziantep, Turkey   *2010-2012*
- Graduate Research Assistant, Adiyaman University, Adiyaman, Turkey   *2009-2010*

FELLOWSHIPS AND AWARDS

- Summer 2018 : Departmental Summer Research Fellowship, University of Tennessee, Knoxville.
- 2016-Present : Teaching Assistantship, University of Tennessee, Knoxville.
- 2014-Present : The Ministry of National Education of Turkey (Fellowship for Ph.D).
- 2010-2012 : The Council of Higher Education of Turkey (Fellowship for Master's Degree).
- 2009-2010 : The Turkish Prime Ministry (Fellowship for Master's Degree).

SERVICE AND AFFILIATIONS

- Treasurer of SIAM student chapter, University of Tennessee, 2017 - 2019 .
- Member of Society for Industrial and Applied Mathematics (SIAM), and AMS, 2016 - Present.
- Vice–President of the Turkish Student Association at University of Tennessee, 2015 - 2019.
- President of Graduate Student Association at Adiyaman University, 2009-2010.
- President of Undergraduate Student Association at Adiyaman University, 2007-2009.

REFERANCES

Prof. Suzanne Lenhart
Department of Mathematics
University of Tennessee
Phone: (865) 974-4270
E-mail: lenhart@math.utk.edu

Prof. Judy D. Day
Department of EECS &
Department of Mathematics
University of Tennessee
Phone: (865) 974-8419
E-mail: judyday@utk.edu

Louis J. Gross, Distinguished Prof.
Ecology / Evolutionary Biology &
Department of Mathematics
University of Tennessee
Phone: (865) 974-4295
E-mail: gross@tiem.utk.edu