

Emine Celik

Curriculum Vitae

Department of Mathematics
Sakarya University

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Education

- 2011-2016 **Ph. D. in Mathematics**, *Texas Tech University*.
2009-2011 **M. S. in Mathematics**, *Lehigh University*.
2005-2007 **M. S. in Mathematics**, *Yildiz Technical University*, Istanbul, Turkey.
2000-2005 **B. S. in Mathematics**, *Yildiz Technical University*, Istanbul, Turkey.

Employment

- 2023– **Assistant Professor**, *Sakarya University*.
2019–2023 **Lecturer**, *Sakarya University*.
2016–2018 **Postdoctoral Assistant Professor**, *University of Nevada, Reno*.
2013–2016 **Graduate Instructor**, *Texas Tech University*.
Primary lecturer for several undergraduate mathematics courses.
2011–2013 **Teaching Assistant**, *Texas Tech University*.
Assisted professors with grading, proctoring, and teaching discussion sections.
2006–2008 **Mathematics Teacher and the Group President of Mathematics**, *Turkish Republic Vasif Cinar Middle School*, Istanbul, Turkey.

Research Interests

- Partial differential equations
- Porous medium equations, fluid dynamics
- Navier-Stokes equations
- Approximate techniques on fractional differential equations

Publications

- [1] Emine Celik and Luan Hoang. *Generalized Forchheimer flows in heterogeneous porous media*. 2015. *Nonlinearity*, Vol. 29, No. 3 (March 2016), 1124-1155. doi:10.1088/0951-7715/29/3/1124
- [2] Emine Celik and Luan Hoang. *Maximum estimates for generalized Forchheimer flows in heterogeneous porous media*. *Journal of Differential Equations* Volume 262, Issue 3 (5 February 2017), 2158-2195. doi:10.1016/j.jde.2016.10.043
- [3] Emine Celik, Luan Hoang, and Thinh Kieu. *Generalized Forchheimer flows of isentropic gases*. *Journal of Mathematical Fluid Mechanics*, March 2018. Volume 20, Issue 1, 83-115. doi:10.1007/s00021-016-0313-2
- [4] Emine Celik, Luan Hoang, Akif Ibragimov and Thinh Kieu. *Fluid flows of mixed*

- regimes in porous media*. Journal of Mathematical Physics, Volume 58 (2017), No. 2, 023102, 30pp. doi:10.1063/1.4976195
- [5] Emine Celik, Luan Hoang, and Thinh Kieu. *Doubly nonlinear parabolic equations for a general class of Forchheimer gas flows in porous media*. Nonlinearity. Volume 31, No. 8 (2018) 3617-3650. <https://iopscience.iop.org/article/10.1088/1361-6544/aabf05/meta>
- [6] Emine Celik, Eric Olson, and Edriss S. Titi. *Spectral Filtering of Interpolant Observables for Discrete-in-time Downscaling Data Assimilation Algorithm*. SIAM Journal on Applied Dynamical Systems. Volume 18, Issue. 2(2019), 1118–1142. <https://epubs.siam.org/doi/abs/10.1137/18M1218480>.
- [7] Emine Celik, Luan Hoang, and Thinh Kieu. *Slightly compressible Forchheimer flows in rotating porous media* Journal of Mathematical Physics. Volume 62 (2021), No. 7, 073101, 39pp.
- [8] Yulong Li, Aleksey Telyakovskiy, Emine Celik. *Analysis of one-sided 1-D fractional diffusion operator*. Communications on Pure and Applied Analysis. Volume 21 (2022), No. 5, 1673-1690.
- [9] Emine Çelik, Yulong Li, Aleksey S. Telyakovskiy. *On the fractional Newton method with Caputo derivative*. Trudy Instituta Matematiki i Mekhaniki UrO RAN. 2022, vol. 28, no. 4, pp. 273–276.
- [10] Emine Celik, Luan Hoang, and Thinh Kieu. *Studying a doubly nonlinear model of slightly compressible Forchheimer flows in rotating porous media*. Turkish Journal of Mathematics. Vol. 47, No. 3 (2023), 949–987. DOI: 10.55730/1300-0098.3405
- [11] Emine Celik and Eric Olson. *Data Assimilation using Time-Delay Nudging in the Presence of Gaussian Noise*. Journal of Nonlinear Science Vol 33, 110 (2023). <https://doi.org/10.1007/s00332-023-09967-1>.
- [12] Yulong Li, Emine Celik, Aleksey Telyakovskiy. *Analysis of a class of completely non-local elliptic diffusion operators*. Fract Calc Appl Anal. 27, 519–553 (2024). <https://doi.org/10.1007/s13540-024-00254-8>.
- [13] Sema Bayraktar, Emine Çelik, Şevket Gür. *Continuous dependence of solutions to a fourth order evolution equation*. Sigma Journal of Engineering and Natural Sciences. in press.
- [14] Md Nurul Raihen, Emine Celik, Yulong Li, Aleksey S. Telyakovskiy *Discussion “Fractional radial-cylindrical diffusivity model for levels of heterogeneity in petroleum reservoirs” by G. Parker-Lamptey, P. Amoako-Yirenkyi and I.K. Dontwi, Journal of Petroleum Exploration and Production Technology, 2018, p. 485-494* 1–4, submitted.

Work in progress

- On Structural Stability in Heterogeneous Porous Media with Weights, (with Luan Hoang), in preparation.
- The Continuous-in-time Limit of a Discrete-in-time Data Assimilation Method, (with Eric Olson), in preparation.
- On a data assimilation algorithm that uses derivative information of the observations as well as the observations themselves, (with Eric Olson and Beau Smith), in preparation.

- Approximate analytical solutions to porous medium equations (with Yulong Li, Md Nurul Raihen, and Aleksey Telyakovskiy), in preparation.
- On initial value problems with fractional derivative (with Yulong Li, Md Nurul Raihen and Aleksey Telyakovskiy), in preparation.
- Generalized Forchheimer flows in geophysical fluid dynamics, (with Luan Hoang and Tinh Kieu), in preparation.
- On finite degree of freedom for fluids, (with Luan Hoang), in preparation.

Conferences

- 1.2017 2017 Joint Mathematics Meetings, Atlanta, GA.
Co-organizer of special Session on PDEs for Fluid flow: Analysis and Computation (Special Session #60).
- 7.2016 The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications-Hyatt Regency, Orlando, Florida.
 Title 1 *Doubly nonlinear parabolic equations for a general class of Forchheimer gas flows in porous media.*
- 7.2016 The 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications-Hyatt Regency, Orlando, Florida.
 Title 2 *Mixed regimes of fluids in porous media.*
- 4.2016 The 2016 Texas Differential Equations Conference, Texas State University, San Marcos, Texas.
 Title *Maximum estimates for generalized Forchheimer flows in heterogeneous porous media.*
- 3.2016 The 40th SIAM Southeastern Atlantic Section Conference (SIAM-SEAS). Applied Mathematics. University of Georgia, Athens, Georgia.
 Title *On a general class of Forchheimer gas flows in porous media.*
- 12.2015 SIAM Conference on Analysis of Partial Differential Equations, Scottsdale, Arizona.
 Title *Coupling models for Darcy, pre-Darcy, and post-Darcy flows in porous media: analysis and application.*
- 4.2015 AMS 2015 Spring Western Sectional Meeting, University of Nevada, Las Vegas, Las Vegas, NV, April 18-19.
 Title *Estimates for generalized Forchheimer flows in heterogeneous porous media.*
- 3.2015 AMS 2015 Spring Southeastern Sectional Meeting, University of Alabama in Huntsville, Huntsville, AL, March 27-29.
 Title *General Forchheimer-Ward equations for compressible fluids.*

Seminars and Colloquia

- 05.2019 Departmental Colloquium, Istanbul University, Istanbul, Turkey.
 Title: *Mixed regimes in porous media.*

- 11.2016 Departmental Colloquium, University of Nevada-Reno, Reno, NV.
 Title: *Generalized Forchheimer Flows of Compressible Fluids in Heterogeneous Porous Media*
- 2.2016 Applied Mathematics Seminar, Texas Tech University, Lubbock, TX.
 Title: *Slightly compressible fluids in heterogeneous porous media.*
- 10.2015 Applied Mathematics Seminar, Texas Tech University, Lubbock, TX.
 Title: *Fluid flows of mixed types in porous media.*
- 2.2015 Applied Mathematics Seminar, Texas Tech University, Lubbock, TX.
 Title: *General Forchheimer-Ward equations for compressible fluids.*

Mathematical Reviews

Reviewer for Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences. Water Resources Research. Journal of Mathematical Physics. Journal of the Institute of Science and Technology, Igdir University.

Service

- 2023-Present Associate Chair of the Mathematics Department, SAU
 2023-Present Member of the Department Council, SAU
 2023-Present Member of the Faculty Executive Board, SAU
 2023-Present Member of the Faculty Council, SAU
 2023-Present Coordinator of the Pedagogical Formation Program in the Faculty of Science, SAU
 2023-Present Member of the Undergraduate Student Projects Committee in the Faculty of Science, SAU
 2021-Present Member of the Curriculum Development and Equivalency Committee, SAU.
 2019-Present Member of the Erasmus, Farabi, and Mevlana Exchange Programs Committee, SAU.
 2017-2018 Member of Graduate Professional Development Committee, UNR.

Dissertation, Theses

- Title *Generalized Forchheimer flows of compressible fluids in heterogeneous porous media*, Ph. D. dissertation in Mathematics, 2016.
 Advisor Prof. Luan Hoang
- Title *Multiplication operators*, M. S. thesis in Mathematics, 2007.
 Advisor Prof. Omer Gok
- Title *Metric spaces*, B. S. thesis in Mathematics, 2005.
 Advisor Prof. Omer Gok

Awards, Grants and Fellowships

- 2014-2017 Graduate student research is partially supported by *NSF DMS-1412796: Nonlinear couplings for flows in fractured porous media: Analysis and numerical algorithms.*
- 2015-2016 *Herman Reynolds Grad-Math Scholarship Award*, Texas Tech University.

- 2015 Graduate Student Travel Grant, AMS 2015 Spring Western Sectional Meeting, University of Nevada, Las Vegas, Las Vegas, NV, April 18-19.
- 2015 SIAM-TTU Student Chapter Travel Grant, AMS 2015 Spring Southeastern Sectional Meeting, University of Alabama in Huntsville, Huntsville, AL, March 27-29.
- 2009-2013 Graduate student research is partially supported by *NSF DMS-0908177: Analysis of non-linear flows in heterogeneous porous media and applications*.
- 2008-2013 Turkish Ministry of Education fellowship for graduate study in mathematics in U.S.A.

Teaching Experience

2019–
Present **Sakarya University.**

- EBB 404, Teaching Practicum, Spring 2024
- Math 366, Applied Partial Differential Equations, Spring 2024
- SWE 102, Probability and Statistics (in English), Spring 2024
- IST 110, Probability and Statistics, Spring 2024
- MAT 112, Calculus II (English and Turkish), Spring 2024
- MAT 114, Linear Algebra, Spring 2024
- Math 498, Final Project, Spring 2024
- MAT 855, Special Topics in Applied Mathematics, Spring 2024
- EBB 404, Teaching Practicum, Fall 2023
- MAT 307, Partial Differential Equations, Fall 2023
- MAT 498, Final Project, Fall 2023
- MAT 855, Special Topics in Applied Mathematics, Fall 2023
- SBF 123, General Mathematics, Fall 2023
- MAT 115, Linear Algebra (in English), Fall 2023
- MAT 111, Calculus I (English and Turkish), Fall 2023
- MAT 211, Differential Equations (in English), Fall 2023
- MAT 111, Calculus I (in English), Summer 2023
- MAT 498, Final Project, Summer 2023
- MAT 211, Differential Equations (in English), Summer 2023
- MAT 116, Linear Algebra (in English), Spring 2023
- MMM 116, Linear Algebra (in English), Spring 2023
- MAT 112, Calculus II (English and Turkish), Spring 2023
- Math 366, Applied Partial Differential Equations, Spring 2023
- SWE 102, Probability and Statistics (in English), Spring 2023
- Math 498, Final Project, Spring 2023
- Math 115, Linear Algebra (in English), Fall 2022
- Math 111, Calculus I (in English), Fall 2022
- Math 111, Calculus I, Fall 2022
- Math 359, Applied Differential Equations, Fall 2022
- Math 211, Differential Equations (in English), Fall 2022
- Math 211, Differential Equations, Fall 2022

- Math 115, Linear Algebra (in English), Summer 2022
- Math 111, Calculus I (in English), Summer 2022
- Math 112, Calculus II (in English), Summer 2022
- Math 359, Applied Differential Equations, Summer 2022
- Math 211, Differential Equations (in English), Summer 2022
- Math 114, Linear Algebra (in English), Spring 2022
- MMM 116, Linear Algebra (in English), Spring 2022
- Math 112, Calculus II, Spring 2022
- Math 112, Calculus II (in English), Spring 2022
- Math 498, Final Project, Spring 2022
- Math 366, Applied Partial Differential Equations, Spring 2022
- SWE 102, Probability and Statistics (in English), Spring 2022
- Math 111, Calculus I, Fall 2021
- Math 111, Calculus I (in English), Fall 2021
- Math 211, Differential Equations (in English), Fall 2021
- Math 115, Linear Algebra (in English), Fall 2021
- Math 108, Linear Algebra II, Summer 2021
- Math 259, Introduction to Combinatorics, Summer 2021
- Math 114, Linear Algebra in Engineering (in English), Spring 2021
- Math 112, Calculus II, Spring 2021
- Math 112, Calculus II (in English), Spring 2021
- Math 498, Final Project, Spring 2021
- Math 115, Linear Algebra (in English), Fall 2020
- Math 259, Introduction to Combinatorics, Fall 2020
- Math 111, Calculus I (in English), Fall 2020
- Math 112, Calculus II, Summer 2020
- Math 108, Linear Algebra II, Summer 2020
- Math 498, Final Project, Summer 2020
- Math 114, Linear Algebra in Engineering (in English), Spring 2020
- Math 112, Calculus II, Spring 2020
- Math 112, Calculus II (in English), Spring 2020
- Math 108, Linear Algebra II, Spring 2020
- Math 366, Applied Partial Differential Equations, Spring 2020
- MMM 116, Linear Algebra in Engineering, Spring 2020
- Math 498, Final Project, Spring 2020
- Math 107, Linear Algebra I, Fall 2019
- Math 211, Differential Equations, Fall 2019
- Math 111, Calculus I, Fall 2019
- Math 113, Linear Algebra, Fall 2019
- Math 259, Introduction to Combinatorics, Fall 2019
- Math 107, Linear Algebra I, Summer 2019

- Math 108, Linear Algebra II, Summer 2019
- Math 114, Linear Algebra, Summer 2019

2016–2018 **University of Nevada.**

- Math 285-1001, Differential Equations, Spring 2018
- Math 285-1003, Differential Equations, Spring 2018
- Math 285-1001, Differential Equations, Fall 2017
- Math 285-1004, Differential Equations, Fall 2017
- Math 181-2702, Calculus I, Summer 2017
- Math 285-1001, Differential Equations, Spring 2017
- Math 285-1003, Differential Equations, Spring 2017
- Math 330-1003, Linear Algebra, Fall 2016
- Math 182-1001, Calculus II, Fall 2016

2013–2016 **Texas Tech University.**

- Math 1452, Calculus II with Applications, Summer 2016
- Math 1452, Calculus II with Applications, Spring 2016
- Math 1451, Calculus I with Applications, Fall 2015
- Math 1452, Calculus II with Applications, Spring 2015
- Math 1452, Calculus II with Applications, Fall 2014
- Math 1330, Introduction to Business Mathematics, Summer II 2014
- Math 1452, Calculus II with Applications, Spring 2014
- Math 1451, Calculus I with Applications, Fall 2013
- Math 1550, PreCalculus, Spring 2013

2006–2008 **Turkish Republic Vasif Cinar Middle School, Istanbul, Turkey.**

- Taught 4th, 6th, 7th and 8th grade mathematics. Designed curriculum and lesson plans for mathematics.

Students Advised

2023–2024 **Advisor for TÜBİTAK 2209 Undergraduate Project, Student: Aslı Pesrek, Investigation of Recent Developments in a Perturbation Method for Resonance and Repeated Root Solutions of Ordinary Differential Equations Applied to Different Types of Equations..**

2023-Present **Sevilay Safiye Ayan, Master's advisor.**

Research Experience

Summer 2016 **Research Asistant, Texas Tech University, Lubbock, TX.**

Summer 2015 **Research Asistant, Texas Tech University, Lubbock, TX.**

Summer 2005 **Internship, The Institute of Forensic Medicine, Istanbul, Turkey.**

Took basic biologic background for studying on criminal and genetic research such as paternity test and performed with SPSS.

Community Service

- 5.2016 Volunteer for 14th Emmy Noether High School Mathematics Day, TTU.
- 5.2015 Volunteer for 13th Emmy Noether High School Mathematics Day, TTU.
- 2004-2008 Recorded College Mathematics Book for visually-impaired people in The Library of Beyazit Government, Istanbul.

Professional Societies

- American Association for the Advancement of Science
- American Mathematical Society
- Society for Industrial and Applied Mathematics

References

- **Prof. Akif Ibragimov**
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- **Prof. Luan Hoang**
Department of Mathematics and Statistics, Texas Tech University
Box 41042, Broadway and Boston, Lubbock, TX 79409
Phone: (806) 834-3060
Email: luan.hoang@ttu.edu

- **Prof. Eric Olson**
Department of Mathematics and Statistics, University of Nevada, Reno
1664 N. Virginia Street, Reno 89557
Phone: (775) 784-6609
Email: ejolson@unr.edu

- **Prof. Aleksey Telyakovskiy**
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