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

2019–Present **Faculty Member**, *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] Emine Celik, Luan Hoang, and Thinh Kieu. *Studying a doubly nonlinear model of slightly com- pressible Forchheimer flows in rotating porous media.* 1–35, submitted. arXiv Preprint.

[9] Yulong Li, Aleksey Telyakovskiy, Emine Celik. *Theory for the fractional elliptic operator.* 1–34, submitted.

Work in progress

- A comparison of how measurement error affects two discrete-in-time data assimialtion algoritmhs, (with Eric Olson), in preparation.
- Approximate analytical solutions to porous medium equations (with Aleksey Telyakovskiy), in preparation.
- On approximate self-similar solutions to a nonlinear PDE with fractional derivative, (with Aleksey Telyakovskiy and Jeff Mortensen), in preparation.
- Generalized Forchheimer flows in geophysical fluid dynamics, (with Luan Hoang and Thinh 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 Colloqiua

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, Igdır University.

Service

2019-Present Member of Erasmus, Farabi and Mevlana 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**.

- 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 Bussiness 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.

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**
  Department of Mathematics and Statistics Texas Tech University
  Box 41042, Broadway and Boston, Lubbock, TX 79409
  Phone: 806-834-4501
  Email: akif.ibraguimov@ttu.edu

- **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**
  Department of Mathematics and Statistics, University of Nevada, Reno
  1664 N. Virginia Street, Reno 89557
  Phone: (775) 784-1364
  Email: alekseyt@unr.edu